



# Environmental Assessment

**American Colloid Company –  
White Rock Plan of Operations Modification  
(WYW-182589) for Bentonite Mining**

**DOI-BLM-WY-R020-2016-0014-EA**



**May 2016**

"The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands."

BLM/WY/PL-16/009+1310

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## **1.0 INTRODUCTION**

### **1.1 Background**

The bentonite mining company American Colloid Company (ACC) has submitted to the Bureau of Land Management (BLM) the White Rock Plan of Operations Modification seeking approval to expand their mining operations one mile north of Lovell, Wyoming (see Figure 1). Prior to submitting this Plan Modification, ACC drilled exploratory holes (under a Notice of exploratory drilling for bentonite) and collected baseline data on vegetation, wildlife, soils, overburden, and hydrology. This Plan Modification would add a total of 291.5 acres of disturbance to the existing Wyoming Department of Environmental Quality (WDEQ) – Land Quality Division (LQD) Permit 322C located in Big Horn County, Wyoming over the life of the operation. Of the 291.5 acres of proposed mining, 147.4 acres would be located on BLM-managed federal land (T. 56 N., R. 96 W., Sections 2 and 3; and T. 57 N., R. 95 W., Section 31), 59.9 acres would be on ACC patented land (T. 56 N., R. 96 W., Sections 2 and 3), 47.3 acres would be on state land (T. 57 N., R. 96 W., Section 36), and the remaining 36.9 acres would be on private land (T. 56 N., R. 96 W., Section 2). On public land, new bentonite mining is proposed on the unpatented Black, Joy, Sara, Scout, and White Rock claims within an amended and updated WDEQ State Permit 322C mine area.

ACC was first issued Permit 322C by the WDEQ-LQD in 1975. Since that time, numerous amendments and updates to the permit have been approved by the WDEQ-LQD. ACC has currently disturbed approximately 3,400 acres of land in the Bighorn Basin. A National Environmental Policy Act (NEPA) analyses has been conducted whenever public lands were proposed to be mined since 1981.

### **1.2 Purpose and Need**

The purpose of the proposed project is to allow ACC to develop its mining claims on BLM-managed public lands in T. 56 N., R. 96 W., Sections 2 and 3 and T. 57 N., R. 95 W., Section 31. The need for this project is established by the BLM's responsibility to administer the rights of entry and use under the Mining Laws (1872), as amended, and the requirements in the regulations at 43 CFR (Code of Federal Regulations) §3809 to review the submitted Plan of Operations Modification to ensure the prevention of unnecessary or undue degradation and proper reclamation bonding.

### ***Decision to be Made***

The Authorized Officer (AO), the BLM Cody Field Manager, must determine whether to authorize ACC's White Rock Plan of Operations Modification on the identified BLM-managed public lands.



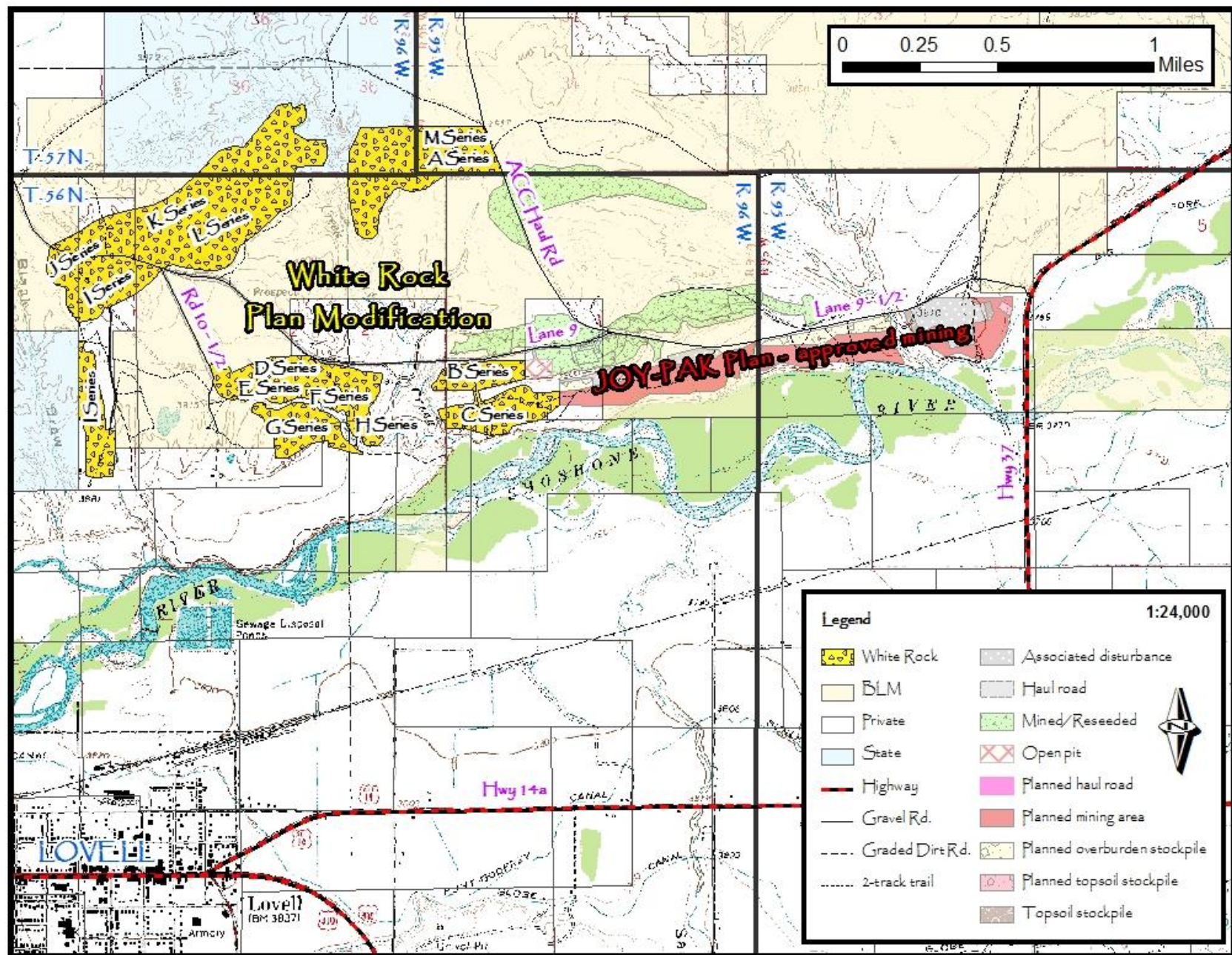


Figure 1. ACC's White Rock Plan of Operations Modification area (represented by yellow "White Rock" feature in the Legend).

### **1.3 Issues identified during scoping**

Internal scoping was conducted in the BLM Cody Field Office (CYFO) by an interdisciplinary team. No unusual environmental issues were identified relative to the proposed mine plan. The EA was listed on the Wyoming BLM State Office NEPA Register webpage on November 20, 2015, which notified the public of the impending mine plan. Internal scoping resulted primarily in the following BLM specialist concerns:

- 1) Air quality could be affected by the dust and exhaust generated by the burning of fossil fuels associated with bentonite mining.
- 2) Bentonite mining would modify area hydrology which could increase sedimentation and water runoff into surface and groundwater as well as into wetlands, riparian areas, and aquatic habitats.
- 3) Area soils would be disturbed and altered by the proposed mining.
- 4) Revegetation of areas disturbed by mining would be difficult due to changes in post-mining soil characteristics, the dry climate, and the presence of invasive weeds.
- 5) Invasive weed species could spread through the proposed mining process.
- 6) Disturbance caused by the proposed bentonite mining would affect suitable habitat for migratory bird species.
- 7) One known golden eagle nest, known bald eagle roosting areas along the Shoshone River, and potential nesting habitat for both species are present within one-half mile of the proposed mining disturbance.
- 8) Bentonite mining would affect wildlife habitat and use in the proposed mining area.
- 9) Bentonite mining would increase the ability for people to access the proposed mining area, which could increase human disturbance to cultural and wildlife resources.
- 10) Trespass livestock issues may evolve if existing fences in the proposed Modification area were not maintained or kept in operating condition.
- 10) The proposed mining would cause a temporary loss of forage for livestock and wildlife until the vegetation is reestablished.

### **1.4 Relationship to Statutes, Regulations, Policies, Plans or Other Environmental Analyses**

This Plan of Operations Modification has been reviewed to determine if the Proposed Action conforms with the *Cody Field Office Approved Resource Management Plan*, approved as a component of the Record of Decision (ROD) for the Rocky Mountain Region (September 2015). The Proposed Action is specifically supported by Record 2002, that states, "Lands not formally withdrawn or segregated from mineral entry are available for mineral entry for bentonite, gypsum, and other locatable minerals." The area proposed for new mining under this Modification has not been withdrawn from mineral entry; therefore it is open to mining claim location and subsequent mineral development after proper review and approval.

The BLM is required under the General Mining Law of 1872, the Surface Resources Act of 1955, the Federal Land Policy and Management Act of 1976, and the surface management regulations at 43 CFR § 3809, to review Plans of Operation for compliance with the regulations, and to ensure the mining plan would not cause unnecessary and undue degradation as defined in 43 CFR § 3809.5. The No Action Alternative (Alternative I) could only be selected if the proposed Modification would result in unnecessary and undue degradation of the public lands.



The BLM and WDEQ-LQD jointly permit and regulate the mining of bentonite and other locatable minerals as outlined in the 2003 supplement to the general statewide Memorandum of Understanding (MOU), No. WY 19, dated October 1975 between the Governor of Wyoming and the Wyoming BLM (Supplement, 2003). The WDEQ-LQD administers and enforces all state statutes and regulations on land disturbances dealing with mining and reclamation within Wyoming. The WDEQ-LQD has the authority to require permitting and licensing of all operator actions in surface mines. Each mine and mine permit area is required by statute and regulation to be covered by a reclamation bond in the event the operator is unable to fulfill reclamation requirements. ACC is covered by such a bond, which is reviewed annually by the WDEQ-LQD and the BLM to ensure it is adequate to cover reclamation of all mining disturbance. The WDEQ-LQD's authority derives from the Wyoming Environmental Quality Act. The WDEQ-LQD permits non-coal mines under the LQD Non-Coal regulations which are related to Article 4 of the Wyoming Environmental Quality Act (W.S. 35-11-401 through 437).

## **2.0 PROPOSED ACTION AND ALTERNATIVES**

### **2.1 Alternative I – No Action**

The No Action Alternative serves as the baseline for comparison of impacts with the Proposed Action. Under the No Action Alternative there would be no bentonite mining in the area encompassed by the proposed Plan of Operations Modification.

### **2.2. Alternative II – Proposed Action**

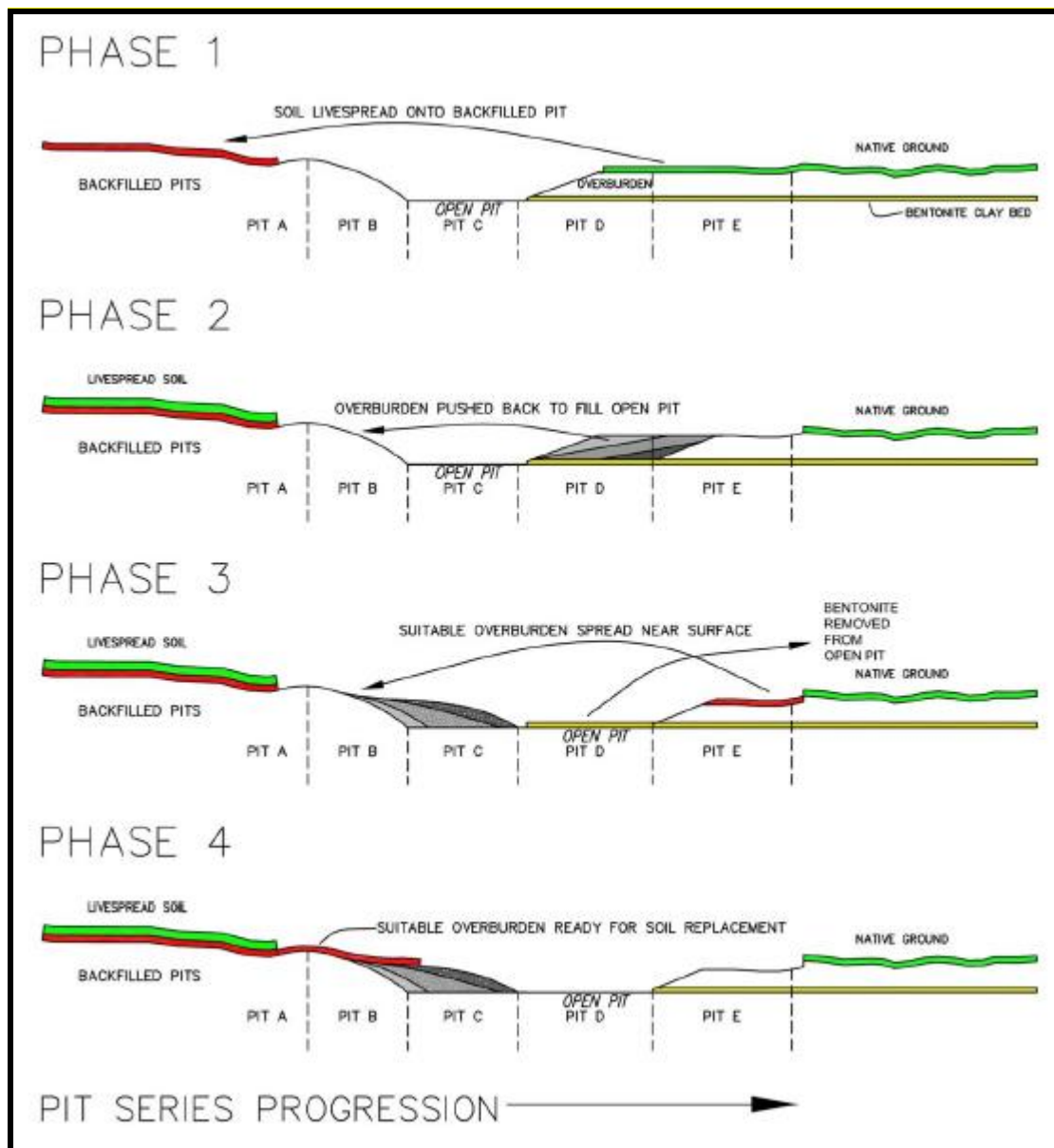
#### **MINE PLAN**

The White Rock Plan of Operations Modification is proposed to have up to a ten-year mine life, which would commence upon its approval. Of the 291.5 acres of proposed mining for bentonite clay, 147.4 acres would be located on BLM-managed federal land administered by the Cody Field Office (CYFO) area (T. 56 N., R. 96 W. Sections 2, and 3; and T. 57 N., R. 95 W., Sec. 31) and the remaining 144.1 acres would be on private and ACC patented land (T. 56 N., R. 96 W. Sections 2, and 3), and state land (T. 57 N., R. 96 W., Sec. 36) in Big Horn County, Wyoming. This location is approximately 2 miles west of ACC's plant in Lovell, Wyoming. Approximately 30 acres would be disturbed per year. Mining activities would include surveying in pit areas, stripping and stockpiling topsoil and subsoil, removal of overburden from the clay bed(s), stripping and hauling of bentonite, backfilling the pit with overburden, recontouring the area, and final reclamation including spreading subsoil and topsoil, followed by seeding.

Equipment used to conduct mining would include the following: D-8, D-9, D-10, D-11, and 375 dozers; 627 and 637 scrapers; 980, 450, 972, and 966 front-end loaders; 140, 14, and 16 motor graders; 300, 308, 330, and 345 excavators; and over-the-road belly dump haul trucks.

Bentonite mining typically would be conducted using the cast-back method where, after top and subsoil removal and salvage, overburden from a pit would be used to backfill the adjacent preceding pit that had been mined out. Pit reclamation would take place concurrently with mining where possible. Salvaged topsoil and subsoil would be stripped by scrapers from all affected areas in at least two separate lifts and either stockpiled separately or live spread directly onto previously backfilled pits.

After a pit series is established, ACC would utilize concurrent mining and reclamation as shown in Figure 2.



**Figure 2. Schematic of a castback mining operation (ACC) with phase descriptions below.**

**Phase 1:** An open pit (Pit C) has had the bentonite excavated from it. Behind Pit C are a partially backfilled pit (Pit B) and previous pits (Pit A and prior pits) that have been backfilled and contoured. In preparation of the opening of the next pit (Pit D), scrapers strip soil resources which are live spread over the backfilled and contoured pits. If no area is available to spread the soil, the soil would be stockpiled for later use.

**Phase 2:** The exposed overburden over future Pit D is ripped with dozers and then pushed with dozers or hauled by scrapers to finish filling Pit B and begin filling Pit C. This leads to the opening of Pit D. As the overburden is moved, it tends to be mixed across strata so that any potential undesirable chemical properties are diluted in the reclaimed pit. Material closest to the bentonite is typically buried deepest in the reclaimed pit. During this phase, the overburden over Pit B is contoured to blend with native topography.

**Phase 3:** After the bentonite is removed from Pit D, the most suitable material, which is often the uppermost material, is removed where soil resources have been stripped over future Pit E. At least four feet of suitable material is spread over the overburden moved in Phase 2 to establish an adequate root zone depth.

**Phase 4:** The suitable material from Pit E has been spread and contoured over the overburden of Pit B. All bentonite has been removed from Pit D. Phase 1 can now be restarted with the striping of soil resources that would be live spread over the suitable material on Pit B.

Topsoil and subsoil stockpiles would be clearly marked with signs reading “TOPSOIL” and “SUBSOIL.” Stockpiles that would be left in place for more than one year would be seeded. Reseeding of stockpiles would occur if erosional stability is compromised due to insufficient vegetation establishment. Either an appropriate BLM-approved seed mix or the following seed mix would be used on topsoil stockpiles left in place for more than one year:

<b>Seed Species</b>	<b>Rate-lb PLS/acre</b>
Thickspike wheatgrass ( <i>Elymus lanceolatus</i> )	1.0
Slender wheatgrass ( <i>Elymus trachycaulus</i> )	5.0
Annual Sunflower ( <i>Helianthus annuus</i> )	0.5
Cover Crop*	10.0
	16.5 lb PLS/acre

\*sterile barley, winter wheat, or annual ryegrass

Western wheatgrass or streambank wheatgrass could be substituted for thickspike and slender wheatgrass.

The bentonite beds within the White Rock Modification area are on average two feet thick. The average overburden thickness in the proposed pit sequences (generally 1-3 acres in size) would range from one to 50 feet, with pit volumes ranging from approximately 20,000 to 100,000 cubic yards of overburden. Overburden removed from the first pit of a mine series would be stockpiled in out of pit spoil piles (OOPS piles). All overburden piles would be constructed away from drainages so natural water flow would not be impeded or would be constructed to allow through drainage. Five permanent and one temporary OOPS pile would be constructed. Permanent OOPS piles would be located in the A, D, F, I, and L series. Some overburden sample zones indicate unsuitable values for vegetation growth. These zones would not be replaced near the surface in the reclamation root zone. Prior to final reclamation, piles would be reclaimed to have stable slopes no steeper than 4:1 and would be designed with the best available material placed near the surface and contoured to blend in with the surrounding topography prior to placing soil over the pile. Reclamation of the last pit in the mine series would be accomplished by filling it with material from a temporary overburden stockpile. If no overburden stockpile is available for replacement, material from the surrounding area would be utilized and contoured to provide through drainage.

Bentonite stockpiling would be minimized to the extent possible; however some stockpiles would be necessary for field drying or storage prior to hauling to the plant. Containment berms or basins would be constructed around any bentonite stockpiles. The timing and locations of active mining would vary by market demands for various clay qualities as well as weather conditions.

All bentonite mined in the White Rock Modification area would be hauled to ACC’s plant site via Highway 37. Multiple access points would be required to transport the material to Highway 37.

The A and M series would be accessed via in-pit haul roads and an existing ACC haul road that bounds the east side of these series. The D, E, F, and a portion of the H series would be accessed via in-pit haul roads and Big Horn County Lane 9. An existing two-track trail would be upgraded to an out-of-pit haul road in order to cross an irrigation ditch and access the G and a portion of the H series. The J and a portion of the I series would be accessed via in-pit haul roads and Lane 9. An existing trail would be upgraded to an out-of-pit haul road in order to access the remainder of the I series. The K and L series would be accessed via in-pit haul roads and Lane 9. The C series would be accessed via a small out-of-pit haul road, in-pit haul roads, and Lane 9 ½.

Roads constructed on public land would be designed according to BLM Road Manual standards and would be reclaimed once mining concludes in an area unless otherwise desired by BLM. ACC would replace existing four string fence gates with cattle guards where applicable on haul roads.

ACC would implement a Spill Contingency and Countermeasure Plan for their mine sites, which would be followed in the event of a fuel or deleterious material spill. No equipment would be serviced or fueled within at least 300 feet of the riparian areas present in the area. Fuel would be delivered to the mine sites and stored in mobile tanks that are relocated as necessary as mining equipment would move throughout the White Rock Modification area. Containment berms would be constructed using overburden around any fuel tanks, which would be located within an area where topsoil and subsoil have been removed, thereby creating a secondary containment basin. If a spill would occur, mine personnel would be instructed to make sure the site is safe, stop additional spilling, ensure containment of spilled materials, and contact the company's environmental representative. Per ACC's Stormwater Pollution Prevention Plan, all spills over 25 gallons would be reported to the WDEQ. Disposal of the contaminated material would be coordinated by ACC environmental personnel at an approved landfill in accordance with state and federal regulations.

If mined bentonite is unintentionally spilled onto native land during mining operations, mine personnel would be instructed to immediately remove the material and further clean the site to ensure that deleterious effects would be minimized. If the magnitude of the spill requires the use of earth moving equipment to remove the bentonite, ACC would work with the BLM and the WDEQ-LQD to ensure any disturbance would be properly reclaimed once the bentonite has been removed from the area.

A series of irrigation ditches exist in the White Rock area. The main irrigation ditch would not be mined through, and no mining would occur within 30 feet of the primary channel. The wastewater portion of the irrigation ditch in the southeastern part of the area would also not be mined through. Upgraded road crossings would be constructed over these ditches. A former native drainage converted to an irrigation ditch would be mined through, but the water right holder would be coordinated with to ensure that downstream service is maintained.

Best management practices would be implemented to minimize run-off into the Shoshone River. No mining would occur within 100 feet of the Shoshone River bluffs. Straw bales, erosion blankets, sediment fences, and/or water bars would be used for erosion control. Storm water run-off would be controlled by constructing temporary diversion ditches. Ditches would be triangular in shape and a minimum of 1.5 feet deep with 2:1 side slopes. Soil salvaged during ditch construction would be placed in a berm on the downslope side preventing additional run-off. Larger interceptor ditches with a bottom width of 12 feet and 1:1 side slopes may also be constructed with a scraper. Interceptor ditches would have sufficient capacity to pass the peak flow from the 2-year, 6-hour storm event as required by WDEQ-LQD Non Coal Rules and Regulations, Chapter 3, Section 2(e)(ii)(F). When no longer necessary, interceptor ditches would be blended into adjacent topography, soiled, and seeded.

If surface water accumulates in an open pit, it would be buried or used to control dust in the disturbed area and on haul roads. Temporary overburden and soil stockpiles would not block drainages. Permanent overburden piles would be constructed to allow natural drainage. Following reclamation, all disturbed areas would be seeded as soon as possible to minimize erosion.

The mine series of the White Rock Plan Modification are described below (see Figure 1).

The A Series would be mined for the 1.5 to 3 feet thick FB/FC (Crombie and Frame West) bentonite bed in the Frontier Formation. The six pits in this series would be mined to a maximum depth of 50 feet. The first cut from this series would form a permanent out-of-pit spoil pile.

The B Series has complications locating all parties associated with the land's mineral trust.

The C Series would be mined for the 1.5 to 2.5 feet thick MOAM bentonite bed in the Mowry Shale. The three pits in this series would be mined to a maximum depth of 40 feet.

The D Series would be mined for the MOE and MOF (Double) bentonite beds in the Mowry Shale. These beds are typically two feet apart and are between 1.5 to 3 feet thick. The D Series consists of approximately seven pits that would have a maximum depth of 45 feet. The first cut from this series would form a permanent out-of-pit spoil pile. An existing fence on the eastern end of the series would be disturbed and replaced after final reclamation has occurred. Existing two-track trails would be disturbed by the mining but recreated.

The E Series would be mined for the 1.5 to 2 feet thick MOD (Commercial) bentonite bed in the Mowry Shale. The five pits in this series would be mined to a maximum depth of 50 feet. A small portion of an existing fence on the eastern edge of the series would be disturbed and replaced after final reclamation has occurred. Existing two-track trails would be disturbed by the mining but recreated. The series is split by an irrigation ditch which would not be disturbed.

The F Series would be mined for the 1.5 to 4 feet thick MOB/MOC (Double D) bentonite bed in the Mowry Shale. The three pits in this series would be mined to a maximum depth of 40 feet. The first cut from this series would form a permanent out-of-pit spoil pile. An abandoned oil exploration well is present in the F Series but would not be disturbed. An existing two-track trail would be disturbed by the mining but recreated.

The G Series would be mined for the 1.5 to 4 feet thick MOB/MOC (Double D) bentonite bed in the Mowry Shale. The six pits in this series would be mined to a maximum depth of 40 feet. An existing two-track trail would be disturbed by the mining but recreated.

The H Series would be mined for the three to six feet thick TG (Thick Grey) bentonite bed in the Thermopolis Shale. The two pits in this series would be mined to a maximum depth of 50 feet. A small portion of an existing fence on the eastern edge of the series would be disturbed and replaced after final reclamation has occurred. An existing two-track trail would be disturbed by the mining but recreated. The series is split by an irrigation ditch which would not be disturbed.



The I Series would be mined for the one to four feet thick FB/FC (Crombie and Frame West) bentonite bed in the Frontier Formation. The nine pits in this series would be mined to a maximum depth of 50 feet. This second phase of this series would affect a native channel that was converted to an irrigation ditch. Mining activity would be coordinated with the water right holder to ensure that downstream service is maintained. The main channel of the irrigation ditch would be avoided with a 30 foot buffer area though the existing crossing would be upgraded. A buried waterline and County Lane 9 cut through the series and would be avoided with 30 foot buffer areas.

The J Series would be mined for the 1 to 2.5 feet thick FD (Tutti-Frutti) bentonite bed in the Frontier Formation. The two pits in this series would be mined to a maximum depth of 50 feet. A buried waterline and County Lane 9 cut through the series and would be avoided with 30 foot buffer areas.

The K Series would be mined for the 1 to 2.5 feet thick FD (Tutti-Frutti) bentonite bed in the Frontier Formation. The two pits in this series would be mined to a maximum depth of 50 feet. A buried waterline and County Lane 9 cut through the series and would be avoided with 30 foot buffer areas. An existing fence on the northern edge of the series would be disturbed and replaced after final reclamation has occurred. Existing two-track trails would be disturbed by the mining but recreated.

The L Series would be mined for the one to four feet thick FB/FC (Crombie and Frame West) bentonite bed in the Frontier Formation. The eight pits in this series would be mined to a maximum depth of 50 feet. County Lane 9 creates the southern end of the series and would be avoided by a 30 foot buffer area. An existing fence on the northern edge of the series would be disturbed and replaced after final reclamation has occurred. An abandoned oil exploration well is present in the L Series but wouldn't be disturbed.

The M Series would be mined for the 1 to 2.5 feet thick FD (Tutti-Frutti) bentonite bed in the Frontier Formation. The six pits in this series would be mined to a maximum depth of 50 feet.

## **RECLAMATION PLAN**

Reclamation would generally be concurrent with mine progression and would begin within two years and be completed within four years of the date the lands were affected. If bentonite is field dried, reclamation would begin within three years and be completed within five years of the date the land is affected.

Rubber-tired scrapers would backfill open pits in a backcast system as described in the mine plan. As the pits are backfilled, they would be contoured and blended to surrounding topography. Swelling of the replaced overburden (on average 30%) would compensate for the volume of the removed bentonite bed. Reclaimed land would be contoured to blend in with the surrounding topography, and slopes would not be steeper than 4:1 in order to provide stabilization against wind and water erosion. Through drainage would be restored in all areas.

The five permanent OOPS piles would be constructed to have stable slopes and would be monitored for erosion. These piles would be designed so that the best available material would be placed near the surface and contoured to blend in with the surrounding topography prior to placing soil over the area. Topsoil and subsoil would be spread over permanent piles at appropriate depths to allow for best possible revegetation success.

Reclamation operations would include removal of any temporary diversions and reestablishment of ephemeral drainages. Reconstruction of the drainages would be accomplished using scrapers or graders to construct flat-bottomed swales that meander as much as practical and are at least as long as the native channels. Where possible, the bottom of the replaced channel would be located on the reclaimed pit floors to mimic pre-existing bedrock conditions. The average slope could be reduced further by placing water bars in the channel to encourage meandering. Reclaimed channels would be feathered to tie into native channels in order to ensure the transition zone remains stable. The irrigation ditch that would be mined through would be reclaimed back to its original dimensions.

Any roads constructed on public land during the proposed mining would be reclaimed to their original condition unless the BLM requests otherwise. Reclamation of the roads would include removal of culverts, fills, and surfacing materials, and grading to blend with native topography. Compacted areas would be ripped with a motor patrol to decompact the road bed prior to application of soil and seeds.

ACC would salvage all available topsoil and subsoil from the proposed disturbance areas. Soil would be direct haul “live-spread” on backfilled pits whenever and wherever possible. Topsoil and subsoil would be spread over all areas where it was salvaged during mining activities in preparation for seeding. Areas where backfilled overburden is compacted due to multiple scraper passes would be ripped with a motor patrol prior to spreading soils. The soil would be replaced by rubber-tired scrapers in two lifts in the reverse order of removal. This would be followed by disking or immediate seeding.

Seeding would be done with a tractor pulling a broadcast seeder mounted on a chisel plow/furrower. This method would leave a moderately rough seedbed to capture and hold water and help protect against wind erosion. Ripping and seeding operations would be done along the contour or perpendicular to the prevailing winds whenever possible. Seeding would take place between October 1st and mid-April. While late fall would be the preferred planting season, weather conditions and the number of acres scheduled for seeding would dictate the actual time of seeding in any given year. Seeding would occur during the first fall/winter after topsoil has been replaced. Newly seeded areas may be protected from grazing livestock by either fencing the reclaimed land or by reaching a grazing management agreement with the landowners.

ACC’s proposed seed mixes are listed below. The “Standard Seed Mix” would be used where Gardner saltbush was dominant in the pre-mine vegetation and the “Big Sagebrush Seed Mix” would be used where Wyoming big sagebrush was dominant in the pre-mine vegetation communities. The “Alternate Species” lists would provide ACC additional species they could substitute into their seed mixes to better match a site’s soil or precipitation requirements, to use if species in the seed mixes are unavailable, or to replace species listed in their seed mixes that have not grown well in other similar areas they have reclaimed. Areas with topography prone to holding moisture would be targeted with 1.0 lbs PLS/acre Wyoming big sagebrush to reestablish sagebrush islands present in pre-mine vegetation communities. The PLS seeding rates are based on broadcast seeding. If drill seeding methods would be used, the rate would be reduced by 30 to 40 percent, except for Wyoming big sagebrush.

**(1) ACC's Standard Seed Mix**

Seed Species	Rate-lb PLS/acre
Indian Ricegrass ( <i>Oryzopsis hymenoides</i> )	1.25
Bottlebrush Squirreltail ( <i>Elymus elymoides</i> )	3.0
Western Wheatgrass ( <i>Pascopyrum smithii</i> )	2.0
Sandberg Bluegrass ( <i>Poa Secunda</i> )	1.0
Bluebunch Wheatgrass ( <i>Pseudoroegneria spicata</i> )	2.0
Sand Dropseed ( <i>Sporobolus cryptandrus</i> )	0.1
Fringed Sagebrush ( <i>Artemisia frigida</i> )	0.5
'Natrona' Fourwing Saltbush ( <i>Atriplex canescens</i> )	4.0
Shadscale ( <i>Atriplex confertifolia</i> )	2.0
Gardner Saltbush ( <i>Atriplex gardneri</i> )	4.0
Rubber Rabbitbrush ( <i>Ericameria nauseosa</i> )	0.5
Rocky Mountain Beeplant ( <i>Cleome serrulata</i> )	0.5
Annual Sunflower ( <i>Helianthus annuus</i> )	1.0
Blue Flax ( <i>Linum lewisii</i> )	0.5
Scarlet Globemallow ( <i>Sphaeralcea coccinea</i> )	0.5
	22.85 lb PLS/acre

**ACC's Alternate Species List for the Standard Seed Mix**

Seed Species	Rate-lb PLS/acre
Thickspike Wheatgrass ( <i>Elymus lanceolatus lanceolatus</i> )	2.0
'Pryor' Slender Wheatgrass ( <i>Elymus trachycaulus</i> )	2.0
Great Basin Wildrye ( <i>Leymus cinereus</i> )	2.0
Russian Wildrye ( <i>Psathyrostachys juncea</i> )	2.0 – private land only
Alkali Sacaton ( <i>Sporobolus airoides</i> )	0.5
Big Sagebrush ( <i>Artemisia tridentata</i> )	1.0
Winterfat ( <i>Krascheninnikovia lanata</i> )	0.5
Western Yarrow ( <i>Achillea millefolium</i> )	1.0
Northern Sweetvetch ( <i>Hedysarum boreale</i> )	0.5
Desert Parsley ( <i>Lomatium spp.</i> )	0.5
Yellow Sweetclover ( <i>Melilotus officinalis</i> )	0.5 – private land only
American Vetch ( <i>Vicia americana</i> )	1.0

**(2) ACC's Big Sagebrush Seed Mix**

Seed Species	Rate-lb PLS/acre
Bottlebrush Squirreltail ( <i>Elymus elymoides</i> )	2.5
Thickspike Wheatgrass ( <i>Elymus lanceolatus lanceolatus</i> )	1.0
Sandberg Bluegrass ( <i>Poa secunda</i> )	1.0
Bluebunch Wheatgrass ( <i>Pseudoroegneria spicata</i> )	1.0
Sand Dropseed ( <i>Sporobolus cryptandrus</i> )	0.1
Fringed Sagebrush ( <i>Artemisia frigida</i> )	0.5
Wyoming Big Sagebrush ( <i>Artemisia tridentata</i> )	1.0
Fourwing Saltbush ( <i>Atriplex canescens</i> )	3.0
Shadscale ( <i>Atriplex confertifolia</i> )	2.0
Gardner Saltbush ( <i>Atriplex gardneri</i> )	4.0
Winterfat ( <i>Krascheninnikovia lanata</i> )	0.5
Rocky Mountain Beeplant ( <i>Cleome serrulata</i> )	0.5
Annual Sunflower ( <i>Helianthus annuus</i> )	0.5
Scarlet Globemallow ( <i>Sphaeralcea coccinea</i> )	0.5
American Vetch ( <i>Vicia americana</i> )	0.5
	18.6 lb PLS/acre

**ACC's Alternate Species List for the Big Sagebrush Seed Mix**

Seed Species	Rate-lb PLS/acre
Indian Ricegrass ( <i>Oryzopsis hymenoides</i> )	1.0
Streambank Wheatgrass ( <i>Elymus lanceolatus riparius</i> )	1.0
'Pryor' Slender Wheatgrass ( <i>Elymus trachycaulus</i> )	1.0
Great Basin Wildrye ( <i>Leymus cinereus</i> )	1.0
Western Wheatgrass ( <i>Pascopyrum smithii</i> )	2.0
Russian Wildrye ( <i>Psathyrostachys juncea</i> )	1.0 - private land only
Alkali Sacaton ( <i>Sporobolus airoides</i> )	0.5
Rubber Rabbitbrush ( <i>Ericameria nauseosa</i> )	0.5
Western Yarrow ( <i>Achillea millefolium</i> )	0.5
Northern Sweetvetch ( <i>Hedysarum boreale</i> )	0.5
Blue Flax ( <i>Linum lewisii</i> )	0.5
Desert Parsley ( <i>Lomatium spp.</i> )	0.5
Yellow Sweetclover ( <i>Melilotus officinalis</i> )	0.5 – private land only

Plains cottonwood (*Populus deltoids*) and various willow species exist within the proposed mine area. Any trees with a diameter at breast height equal to or greater than four inches would be replaced with identical species. Targeted planting of willow species also may occur.

The White Rock area has a number of badlands that are barren of vegetation; soil and seed would be spread in these areas if excess soil is available. Areas without soil would be contoured into existing topography and bladed or harrowed to blend them into adjacent native lands. Limited seeding would occur in badlands where no topsoil has been replaced. These areas would be graded to blend in with surrounding reclamation and native topography; swales and depressions that would accumulate moisture and support vegetation would be seeded with any of the following: black greasewood, Wyoming big sagebrush, or rabbitbrush at a rate of 1.0 lb PLS/acre.

Reseeding or inter-seeding efforts would be considered after four consecutive years of evidence that the initial seeding attempt failed. However, if erosion problems become evident due to lack of vegetation anytime during the four-year evaluation period, efforts to stabilize the erosion, including reseeding, would commence as soon as field conditions allowed.

Weed encroachment on reclaimed areas would be controlled within the parameters set forth in WDEQ-LQD Regulations Chapter 3, Section 2(d)(ix). On BLM-managed public lands, a Pesticide Use Proposal (PUP) and written permission would be obtained from the Authorized Officer prior to the use of herbicides. All herbicide label restrictions would be followed. Cheatgrass spraying, if necessary, would be applied in late summer or early fall using BLM-approved chemicals at BLM-approved rates using calibrated spray tank, truck, backpack sprayer, and/or ATV sprayer. The use of these pesticides and their application on cheatgrass was analyzed in the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (EIS) (2007).

Reclamation standards would continue to be met as per WDEQ-LQD Regulations Chapter 3, Section 2 (d)(vi). ACC would use the extended reference area concept to evaluate revegetation success. At the time of final bond release, the reclaimed land would be compared to the undisturbed, native land adjoining the bond release parcels and/or to pre-mine photos and environmental data. Methods for evaluation of reclamation success would follow the standards mutually agreed upon by ACC and WDEQ-LQD at the time of final bond release. The BLM would be included in the evaluation process where BLM-managed lands are involved.

Reclamation would be determined successful as outlined in WDEQ-LQD Rules and Regulations, Chapter 3 Section 2 at the time of final bond release, which states,

The Administrator shall not release the entire bond of any operator until such time as revegetation is completed, if revegetation is the method of reclamation as specified in the operator's approved reclamation plan. Revegetation shall be deemed to be complete when: (1) the vegetation species of the reclaimed land are self-renewing under natural conditions prevailing at the site; (2) the total vegetation cover of perennial species (excluding noxious weed species) and any species in the approved seed mix is at least equal to the total vegetation cover of perennial species (excluding noxious weed species) on the area before mining; (3) the species diversity and composition are suitable for the approved post-mining land use; and (4) the requirements in (1), (2) and (3) are achieved during one growing season, no earlier than the fifth full growing season on the reclaimed lands. The Administrator shall specify quantitative methods and procedures for determining whether equal total vegetation cover has been established and procedures for evaluating post-mining species diversity and composition.

ACC's proposed mining would mine through an existing fence that divides grazing allotments. ACC would maintain a division between grazing allotments, which may include using temporary fencing to prevent livestock trespass during and after the proposed mining. Fences would be rebuilt to a BLM standard four wire fence. The top three wires would be barbed and the bottom would be a smooth wire that would be, at a minimum, 16 inches off the ground.

## **MONITORING PLAN**

The mine would be monitored for excessive erosion from stormwater runoff which could impact surface water quality. Monitoring frequency would coincide with significant precipitation events. Highwalls of open pits would be monitored for stability by mining and environmental personnel. Topsoil would be salvaged within a buffer zone around all pits to ensure that any highwall slump would not result in loss of topsoil. Backfilled areas would also be monitored for sediment releases. Reclamation would be monitored for erosional problems, vegetation establishment, and the presence of noxious weeds which would need to be controlled. Reseeding or interseeding efforts would be considered after four consecutive years of evidence that the initial seeding attempt failed. Efforts may occur before four years in order to control erosion. On public land, a Pesticide Use Proposal and written approval would be obtained from a BLM Authorized Officer prior to any treatments. Air quality would be visually monitored for dust, and ACC would maintain a steady road watering program wherever hauling activities would occur.

Mine sites would be inspected on a regular basis by ACC's surveyors, mining manager, and environmental personnel. The mine manager would coordinate the mining activity with the site foreman, who would be on site daily to ensure proper operations would be followed according to plan and schedule. Areas of concern would be communicated to the foreman and manager directly from operators and other observers.

The White Rock area would be monitored for the presence and occupation of raptor nests within one mile of the proposed disturbance for bald eagles and ½ mile for all other raptor species between January 15th and July 31st. ACC would monitor the known golden eagle nest for activity between January 15th and July 31st. Ground nest surveys for migratory birds and sage-grouse would occur 72 hours or less prior to any new surface disturbing activities between April 10th and July 15th.



Annual surveys would be conducted for other Endangered, Threatened, Proposed, and Candidate Species, Migratory Bird Species of Management Concern in Wyoming, and BLM Sensitive Species. ACC would monitor for Aquatic Invasive Species (AIS); if equipment is known to have been used in high risk infected water or in a different state between March and November, it would be inspected by an authorized aquatic invasive species inspector recognized by the State of Wyoming prior to entering the proposed White Rock mine area.

#### **INTERIM MANAGEMENT PLAN**

Periods of inactivity would occur at the proposed mine area as equipment moves among different mine areas throughout Permit 322C to provide the plant with the correct clay qualities. Prior to moving equipment from an active mine site, berms and ditches would be constructed to divert surface water around the active mine area. Containment basins would be utilized to collect storm water runoff from temporary overburden piles or bentonite stockpiles. Topsoil would be salvaged from a buffer zone around pits to ensure topsoil resources would not be at risk in the event of a highwall slump. Berms would also be employed to barricade pit highwalls for safety of humans and wildlife.

Overburden stockpiles typically exhibit physical and chemical characteristics that are not conducive to vegetation growth, particularly high Sodium Absorption Ratio (SAR) values. All overburden stockpiles would be constructed on areas where soil materials have been salvaged previously to prevent contamination of soil and surface material that would eventually be used for reclamation. A twelve foot wide buffer around these stockpiles would prevent overburden from sloughing onto adjacent vegetated land and also would contain any storm water runoff. When mining resumes, unsuitable materials would be handled as described in the mine plan.

All equipment would be moved from the site once the area is determined safe, stable, and clean. Occasionally, equipment undergoing repair may be left in the area while waiting for parts. Informal monitoring of these sites would occur as mining and environmental personnel travel between the different mine areas throughout Permit 322C.

### **3.0 AFFECTED ENVIRONMENT**

This chapter presents the potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources) of the impact area as identified during scoping and/or the Interdisciplinary Team process. This chapter provides the baseline for comparison of impacts or environmental consequences described in Chapter 4. Resource issues or concerns which may be affected by the proposed action are presented in Table 1.

**Table 1. Affected Environment, Resource Issues and/or Concerns**

<b>Resource Issues and/or Concern</b>
Air Quality
Cultural Resources and Native American Religious Concerns
Water (Surface and Ground) and Floodplains
Wetlands, Riparian, and Aquatic Resources
Geology and Minerals
Paleontological Resources
Soils
Vegetation
Invasive, Non-native Plant Species
Wildlife, Migratory Birds, and Raptors
Threatened & Endangered Species and BLM Sensitive Species
Livestock Grazing and Range Management
Socioeconomics
Recreation and Visual Resource Management (VRM)

### **3.1 Air Quality**

No site-specific air quality data are available from the White Rock Modification area; however, air quality in the area is considered to be good. The primary air pollutants in the area are dust and emissions such as volatile organic compounds (ground-level ozone), methane, benzene, etc., generated from nearby oil and gas fields. Minor pollutants also are emitted into the air from the towns of Byron, Lovell, Cowley, and Deaver, from vehicles on highways and roads, and from operations in bentonite mines. Other contaminants that may be present in trace to small amounts include hydrogen sulfide (H<sub>2</sub>S), sulfur dioxide, nitrogen oxide, carbon dioxide, and vaporous hydrocarbons. Additional climate data can be found in Appendix A and additional air quality data can be found in Appendix B.

### **3.2 Cultural Resources and Native American Religious Concerns**

A Class III cultural resource inventory meeting the requirements of the Wyoming State Historic Preservation Office (WYSHPO) Format, Guidelines, and Standards for Reports was conducted for the proposed mining area by Llano Consultants (BLM Cult # 020-2013-048). The inventory encountered six (6) sites and two (2) isolated resources. Site types included historic debris scatters and monuments, and prehistoric open camps and cairns. None of the resources were considered eligible for inclusion on the National Register of Historic Places thus resulting in a No Historic Properties Affected determination in accordance with the Wyoming State Protocol between the BLM State Director and the WYSHPO. The area under consideration contains no known or identified areas or locations of religious or cultural concern to Native Americans. No traditional gathering areas have been reported near the current proposal.

### **3.3 Water Quality (Surface and Ground) and Floodplains**

The proposed White Rock Modification area contains several ephemeral drainage systems composed of dry channels, gullies, or washes. Runoff from infrequent rainfall typically is characterized by high-volume, high-velocity, sediment-laden, and turbulent flows with high kinetic energy that ceases soon after the precipitation event stops. For most of these highly localized, short-duration precipitation events, the runoff water never reaches the mainstem channels downstream but instead dissipates into the ephemeral channel beds. Although water is scarce, the amount of water that physically runs off is significant due to the nature of the soils and the lack of effective surface cover. The majority of the proposed mining area lies within one mile of the Shoshone River and is less than 0.25 miles at its closest.

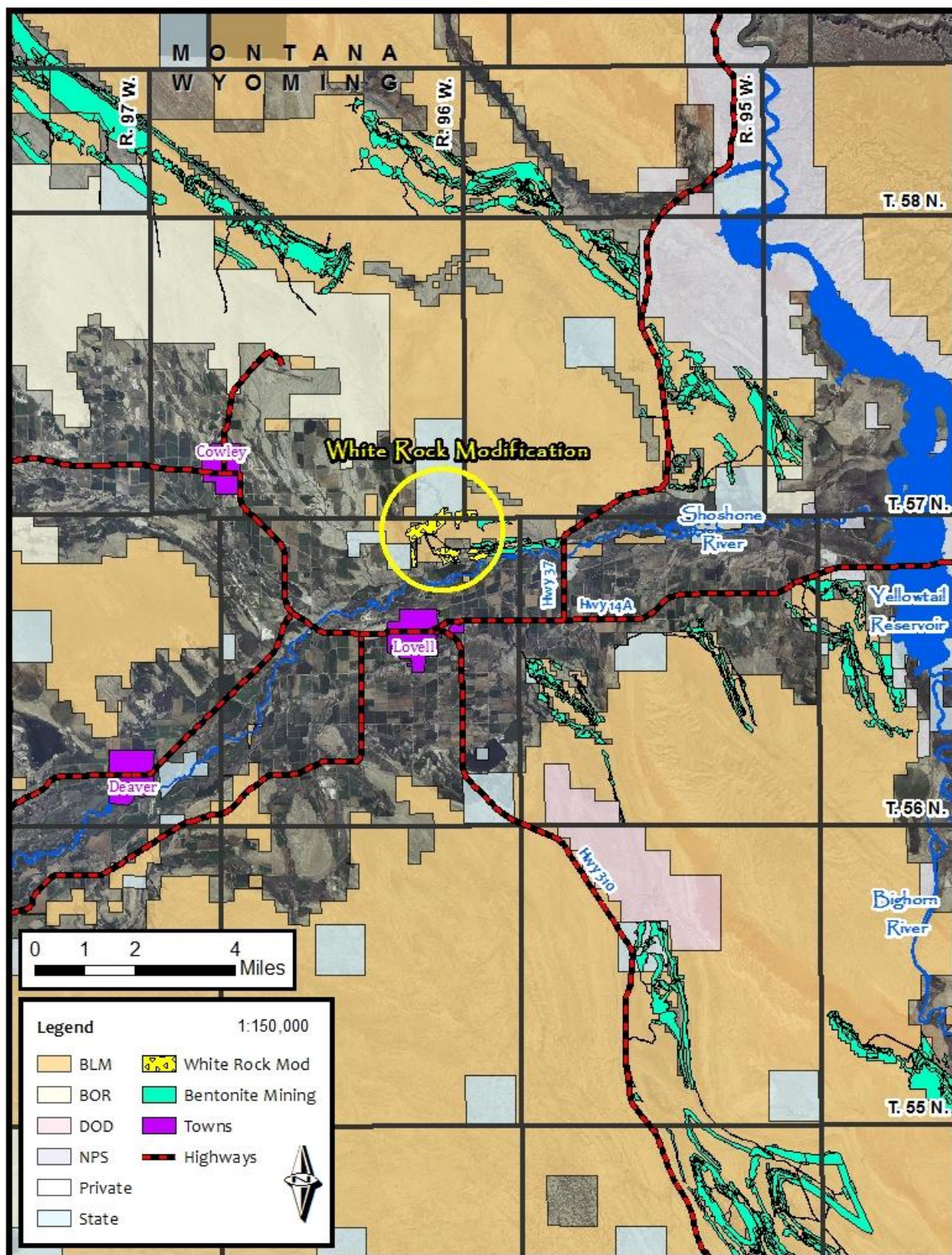


Figure 3. Area map of lands surrounding ACC's White Rock Plan of Operations Modification area.

Channels with flowing water in the area include Dry Creek and three irrigation ditches. Dry Creek is an intermittent stream carrying dominantly waste irrigation water that cuts north to south through the proposed mine area. Dry Creek is not proposed to be disturbed by the mining. A historical irrigation ditch runs northwest to southeast between the J and I Series and will be avoided by a buffer of 100 feet on either side of the ditch. A second irrigation ditch flows generally west to east between the D, E, F, and H Series to the north and the G Series to the south. This intermittent ditch would not be disturbed by the proposed mining. The third irrigation ditch runs through the southern I Series and would be disturbed by the proposed mining. Mining around this intermittent ditch would occur seasonally to ensure the downstream service of the ditch is not affected.

No groundwater wells are present within the proposed mine area; though due to the proximity to Lovell, WY, many groundwater wells exist within three miles. Mining of bentonite pits would be shallow (30-50 feet deep) and would occur above nearby alluvial wells. ACC did not encounter groundwater during their extensive exploration drilling of the area so it is not expected to be found during the proposed mining operations.

### **3.4 Wetlands, Riparian and Aquatic Resources**

There are no wetlands located within the proposed mining area though three wetland areas do exist in the surrounding landscape. The ponds in the southwestern corner of the White Rock area are classified in the National Wetlands Inventory (NWI) as Freshwater Forested/Shrub Wetlands and Freshwater Pond type. Portions of Dry Creek are mapped as NWI Freshwater Emergent Wetland and Freshwater Pond type and Riparian-Ditch and Big Sagebrush Shrubland type. Finally, the Shoshone River corridor was mapped as Freshwater Forested/Shrub Wetland and Riverine type.

### **3.5 Geology and Minerals**

The Bighorn Basin is bounded by the Pryor Mountains to the north, the Bighorn Mountains to the east, the Owl Creek and Bridger Mountains to the south, and the volcanic Absaroka Mountains to the west. The surrounding mountains and associated folds in the Bighorn Basin primarily formed during the Laramide Orogeny, a compressional mountain-building event that took place from Late Cretaceous time to middle-Eocene time approximately 80 to 40 million years ago (mya). The Absaroka Mountains are a result of volcanic activity that began about 50 mya. The center of the basin is filled with flat-lying Eocene sediments (55-34 mya), with progressively more complex folding and faulting in Mesozoic (250-65 mya) and Paleozoic (542-251 mya) strata as the flanks of the mountains are approached.

In the Bighorn Basin, commercial bentonite beds currently are limited to middle-lower Cretaceous strata, identified as the Thermopolis Shale, Mowry Shale, and Frontier Formation. These strata contain sodium bentonite beds of varying thicknesses interbedded with gray, marine shales and claystones which were deposited in the Cretaceous Interior Seaway around 100 million years ago. The White Rock Plan Modification proposes to mine the Thermopolis Shale, Mowry Shale, and Frontier Formation.

**OVERBURDEN:** Overburden sampling characterizes soils and rock units below the surface to determine if their exposure to potential ground or surface water would adversely affect the environment and whether the overburden may be suitable for plant growth. Overburden considered adverse to ground or surface water and plants would generally be managed to minimize its impact to the environment and potential rooting zones. This would include entombing unsuitable material above groundwater zones and well below the surface to prevent any wicking or capillary draw.

Samples of overburden in the proposed White Rock area were tested for several parameters including particle size, pH, electrical conductivity, saturation percentage, concentration of soluble cations (Ca, Mg, Na), sodium absorption ratio (SAR), Nitrogen/Nitrate, acid-base accounting, and concentrations of Molybdenum, Boron, and Selenium. The Cretaceous shales associated with bentonite beds typically have high sodium contents, high salinity (electrical conductivity), high exchangeable sodium (sodium adsorption ratio), high saturation percent, and high clay content.

**MINERAL RESOURCES:** Bentonite is the only locatable mineral found in this area. Limited amounts of sand and gravel are located in the Shoshone River terrace deposits within the proposed White Rock Plan Modification area. No oil and gas leases are known to be located within this area. No solid leasable minerals such as coal or trona occur in the area.

### **3.6 Paleontological Resources**

The Potential Fossil Yield Classification (PFYC) for the area proposed to be mined is rated as a Class 3, meaning there is moderate potential for vertebrate and scientifically significant fossil resources. The geologic formations proposed to be mined are the Thermopolis Shale, Mowry Shale, and Frontier Formation. These formations represent ancient sedimentation in and along a Cretaceous-age interior seaway that covered most of Wyoming at that time. Vertebrate species occupied this seaway, notably marine and terrestrial reptiles and various types of fish. Multiple types of invertebrates also occupied these ancient environments. The Mowry Shale is known for its abundance of fossil fish scales in certain units. The Muddy Sandstone Member of the Thermopolis Shale also yields occasional vertebrate fossils such as teeth and chunks or chips of fossil bone. The Muddy Sandstone Member of the Thermopolis Shale is located stratigraphically below any of the bentonite units.

### **3.7 Soils**

A soil resource inventory was conducted by ACC and its contractors in the White Rock area. Initial mapping units were identified using Natural Resources and Conservation Service (NRCS) and BLM soil survey maps. Soil series names are based on site-specific characteristics and current NRCS series criteria as obtained from the NRCS soils website.

The soil laboratory analyses included: pH, electrical conductivity (EC); saturation percent; calcium, magnesium, sodium, and potassium (meq/l); calculation of Sodium Adsorption Ratio (SAR); organic matter percent; soil texture (percent sand, silt, and clay). Most of the unsuitable subsoils with a high SAR are saline-sodic, which means they contain appreciable quantities of neutral salts and enough sodium ions to affect most plants. Excess sodium indirectly affects plant growth through deterioration of soil structure. This breakdown of soil structure could result in restricted water movement, aeration, root elongation and seedling emergence and development. High levels of salt in the soil also increase the hold that the soil has on water, which limits the vegetation that can occupy the site to only those that can extract the water they need to survive. It also affects the ability of many plant species to extract nutrients. Soils with higher SAR tend to support saline-tolerant vegetation, such as those found in Gardner's saltbush communities.

The proposed White Rock Modification area is within a mesic soil temperature regime (mean annual temperature about 45° F to 50° F) and a typic-aridic soil moisture regime (mean annual precipitation about 5 to 9 inches). The area is characterized by the presence of very shallow to deep soils.

Shallow and moderately deep soils that would be affected by the proposed mining include Chipeta silty clay, Chipeta-Rock Outcrop Complex, Mudray sandy clay, fluvents, and Greybull sandy loam (Figure 4). Chipeta silty clay is a very shallow (4 to 10 inches deep) to shallow (10 to 20 inches deep) soil developing in thin residuum dominantly from shale and/or siltstone bedrock on ridges and sideslopes.



Surface layer textures can include silty clay, clay, clay loam, and loam. Mudray sandy clay can also be very shallow to shallow, and even moderately deep (20 to 40 inches deep) in small areas, but is develops in sodic (high SAR) shale. Chipeta-Rock Outcrop is a complex of the Chipeta soil interspersed with small areas of Rock Outcrop. Fluvents are unconsolidated, variable-textured, alluvial material located in narrow upland drainages, and range in thickness from 6 to 40 inches or more. Greybull sandy loam typically is a moderately deep soil (20 to 40 inches deep) developing in alluvium and residuum from both sandstone and shale, but is dominantly deep (40 inches or deeper) in the project area.

The remaining soils proposed to be disturbed (Kinneer and Stutzman) are both deep (greater than 40 inches to bedrock). Kinneer clay loam develops in fine-loamy slopewash alluvium from sandstone and shale. Stutzman silty clay loam develops in fine-textured clayey alluvium and residuum from shale. Greybull sandy loam and Stutzman are mapped on nearly level to gently sloping bench located above and north of the Shoshone River. Badlands, Shale-Bentonite Outcrop, and Reclaimed Land are also present in the White Rock Modification area.

**Table 2. Soil depths and suitability in the proposed White Rock Modification area.**

Map Unit Name	Topsoil Depth (in)	Subsoil Depth (in)	Suitable Cover Depth (in)	Total Salvage Depth (in)	Limitations to Deeper Salvage
Stutzman silty clay loam, 2 to 4% slopes (41A)	3	6	39	48	Change from soil to shale
Greybull sandy loam, deep, 2 to 20% slopes (71A)	3	6	39	48	Change from soil to shale
Badlands, steep (102)	0	0	0	0	No soil to salvage
Chipeta silty clay, 2 to 6% slopes (C)	4	0-4	40	48	High SAR below 12 feet
Chipeta-Rock Outcrop, 12 to 40% slopes (C-RO)	4	0-4	40	48	High SAR below 12 feet
Fluvents, 0 to 3% slopes (Fl)	6	6	36	48	Depth to bedrock
Kinear clay loam, 2 to 15% slopes (Ki)	4	14	42+	60+	Change from soil to shale
Mudray sandy clay, 2 to 6% slopes (Mu)	3	0	0	3	Very high SAR and EC below 3 inches
Reclaimed Land (RL)	6	6	0	12	Replaced overburden
Shale-Bentonite Outcrop (SBO)	0	0	0	0	No soil to salvage

### **3.8 Vegetation**

Vegetation community types were defined and delineated by ACC based on dominant vegetation species. The following vegetation units were identified and mapped in the study area: Bentonite/Shale Outcrops, Big Sagebrush Shrubland, Gardner Saltbush Shrubland, Reclaimed Land, and Riparian – Ditch (Irrigation).

#### **1) Bentonite/Shale Outcrop:**

This community type includes rock outcrops from the Mowry Shale and Frontier Formation as well as associated bentonite beds. It is predominantly non-vegetated and has shallow to steep slopes. Soils in this community are poor or absent. Vegetation inclusions are uncommon and primarily consist of annual forbs (*Atriplex suckleyi*, *Monolepsis nuttalliana*, and *Sueda nigra*). Gardner saltbush (*Atriplex gardneri*) is occasionally found within this community.

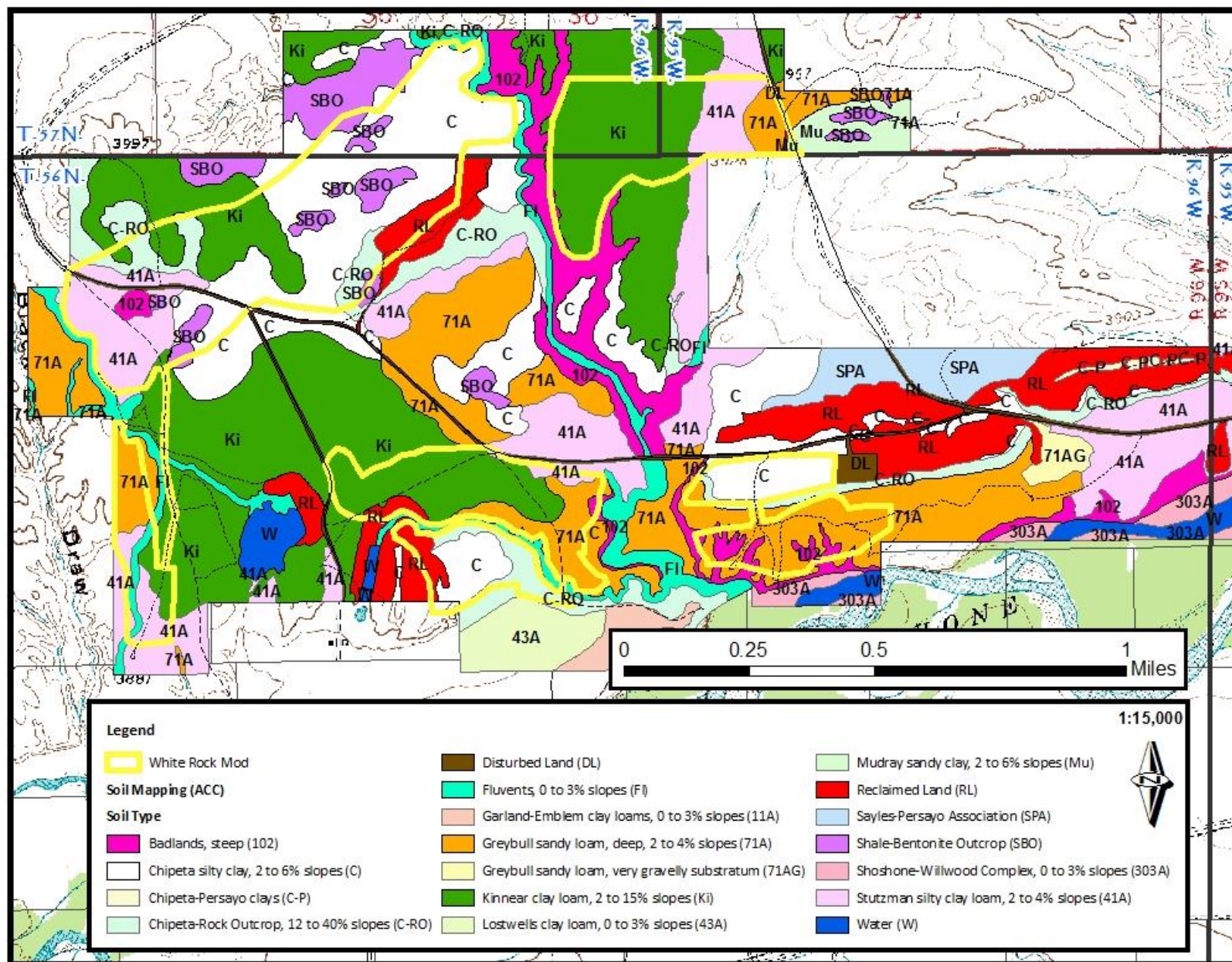


Figure 4. Soil types within ACC's proposed White Rock Plan of Operations Modification area

2) Big Sagebrush Shrubland:

This community type primarily occurs on gravel soils found in the proposed White Rock Modification area. This community is dominated by Wyoming big sagebrush (*Artemisia tridentata wyomingensis*). Other common vegetation species include Gardner saltbush, needle and thread grass (*Hesperostipa comata*), and black greasewood (*Sarcobatus vermiculatus*).

3) Gardner Saltbush Shrubland:

This community type is dominated by Gardner's saltbush. Other common vegetation species in the community include Wyoming big sagebrush, Indian ricegrass (*Achnatherum hymenoides*), and sand dropseed (*Sporobolus cryptandrus*).

4) Reclaimed Lands:

This community type consists of previously mined lands that have been recontoured and reseeded. Almost all of the reclaimed areas resemble the Gardner Saltbush Shrubland community type though the degree of reclamation success significantly varies across the area. Reclaimed land in the proposed White Rock Modification area can be divided into two classes: ACC bond released reclamation and ACC bonded reclamation. No bond released reclamation is located within the proposed disturbance.

5) Riparian – Ditch (Irrigation):

This community type consists of small riparian-like corridors that are present along irrigation ditches in the proposed White Rock Modification area. It is dominated by reed canarygrass (*Phalaris arundinacea*) and smooth brome (*Bromus inermis*), though areas with various sedge (*Carex* sp.) and bulrush (*Schoenoplectus* sp.) species also exist there. Scattered plains cottonwood, Russian olive, tamarisk, and various willow species also are within this community type.

The majority of land within the proposed mining area lies within seven ecological site descriptions, all in the five to nine inch precipitation zone for the Bighorn Basin, as follows: Saline Upland (SU), Shale (Sh), Rock Outcrop (RO), Loamy (Ly), Shallow Loamy (SwLy), Gravelly (Gr), and Sandy (Sy).

### **3.9 Invasive, Non-native Plant Species**

Four species on the Wyoming Weed and Pest Council Control Act Designated Weed List were observed in the White Rock area, including Whitetop (*Cardaria draba*), field bindweed (*Convolvulus arvensis*), tamarisk (*Tamarix* sp.), and Russian olive (*Elaeagnus angustifolia*). One species on Big Horn County's Declared List, swainsonpea (*Sphaerophysa salsula*) was also observed in the area. Though there are invasive weed species present, native plants are still the dominant species in the proposed mining area. Weeds are most common in disturbed areas.

### **3.10 Wildlife, Migratory Birds, and Raptors**

WILDLIFE: ACC conducted 22 wildlife surveys between July 2011 and May 2013, compiled a list of 58 observed wildlife species, and provided this list to the U.S. Fish and Wildlife Service (USFWS) and the Wyoming Game and Fish Department (WGFD) during consultation. Agency responses indicated concern for the following: nesting migratory birds, nesting golden eagles, riparian areas, and Aquatic Invasive Species (AIS).



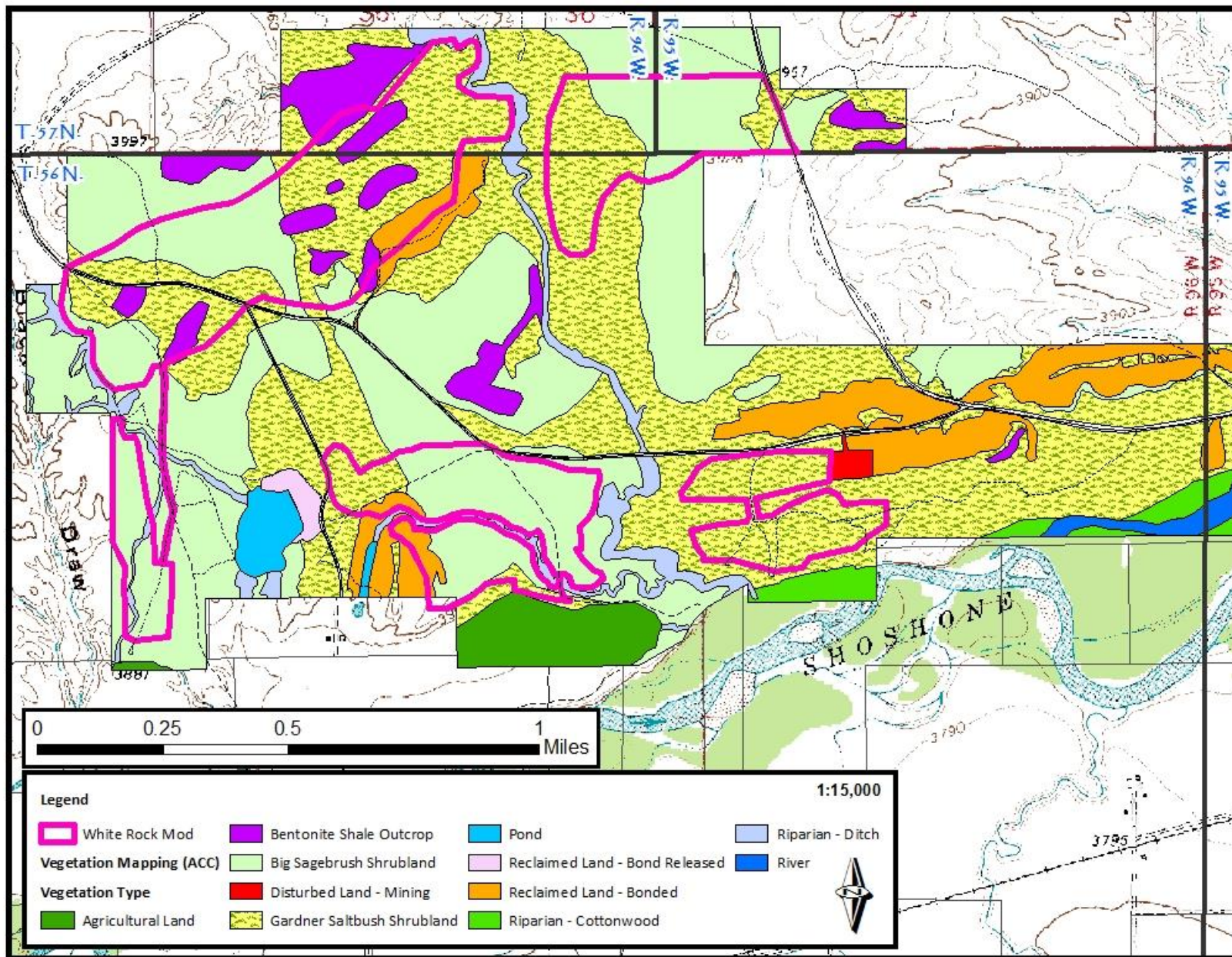


Figure 5. Vegetation types within ACC's proposed White Rock Plan of Operations Modification area

A few of the non-BLM-Sensitive wildlife species that use this area include mule deer, pronghorn antelope, coyote, jackrabbits, cottontail rabbits, Ord's kangaroo rats, olive-sided pocket mice, short horned lizards, sagebrush lizards, prairie rattlesnakes, plains spadefoot toads, golden eagles, red-tailed hawks, northern harriers, turkey vultures, ravens, horned larks, and vesper sparrows. Songbirds migrate to the area to breed, nest and spend the summer. The horned lark, corvids, and raptors are some of the few species that spend the full year in the region; however they still migrate to different habitats and are still considered migratory. Ungulates typically move through the area, utilizing it, as well as other habitat in the region as corridors, places to find food, and places to rear young.

Though wetland and riparian habitat makes up a relatively small amount (7%) of the proposed project area, these areas exhibited the greatest species diversity and were where many perching birds and water birds were observed. The cliffs associated with Dry Creek support a large number of swallow nests as well as a golden eagle nest. The small remainder of observed species, including all mammals and reptiles, were found in the Big Sagebrush Shrubland and Gardner Saltbush Shrubland plant communities.

**RAPTORS:** Raptor species observed in the area include golden eagle, red-tailed hawk, rough-legged hawk, and northern harrier. A golden eagle nest was found in the central portion of the proposed White Rock Modification area on the cliffs overlooking Dry Creek. The nest was active each year between 2011 and 2015.

**MIGRATORY BIRDS:** Many migratory bird species use this area including the following: sage sparrows, lark sparrows, sage thrashers, horned larks, vesper sparrows, Brewer's sparrows, rock wrens, western meadowlarks, mountain plover and loggerhead shrike. These songbirds mate, nest, and over-summer in the areas proposed to be mined. They also frequently return to the same area year after year.

### **3.11 Threatened & Endangered Species and BLM Sensitive Species**

**THREATENED & ENDANGERED SPECIES:** Site surveys have determined that no Threatened or Endangered plant or animal species (lynx, grey wolf, grizzly bear, black-footed ferret and Ute's ladies tresses) are located in the proposed White Rock Modification area.

**BLM SENSITIVE SPECIES:** Several BLM Sensitive Species use the general area including the following: mountain plover, sage sparrows, sage thrashers, Brewer's sparrows, loggerhead shrike, Townsend's big-eared bats, and spotted bats. Persistent sepal yellowcress, a BLM Sensitive plant species, may also be present in and around seasonal wetlands, reservoirs, or stream channels in the area. Wildlife surveys of the area confirmed the presence of Brewer's sparrows and loggerhead shrike in the White Rock Modification area. The proposed mine area includes many acres of potential greater sage-grouse habitat though no observations were made during wildlife surveys. The nearest known lek is approximately 14 miles away.

Mountain plover, which were recently proposed to be listed on the Threatened and Endangered Species List, are currently considered a BLM Sensitive Species and are protected under the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703. Mountain plover conservation management is directed by Record # 4121 in the *Cody Field Office Approved Resource Management Plan* (2015) which states, "Implement conservation measures, terms and conditions, and appropriate BMPs and reasonable prudent measures within existing state programmatic biological opinions for the mountain plover."

### **3.12 Livestock Grazing and Range Management**

The North Shoshone BLM grazing allotment #01036 and the Black Draw Allotment #01058 contain the proposed mining. In the North Shoshone Allotment, approximately 90 of the 18,651 acres (14,827 acres of BLM-managed land) in the allotment are proposed to be mined. There are 365 public animal unit months (AUMs) currently permitted for livestock grazing in this allotment, stocked at 40 acres/AUM. An AUM is defined as the amount of forage necessary for the sustenance of one cow or its equivalent for a period of a month. Generally 600 to 800 pounds dry weight of forage is used per AUM. This allotment has a three-year grazing rotation: spring, fall, rest. In the Black Draw Allotment, approximately 200 of the 1,784 acres (756 acres of BLM-managed land) in the allotment are proposed to be mined. There are 37 public AUMs permitted for livestock grazing in this allotment, stocked at 20 acres/AUM. This allotment has a three-year grazing rotation: spring, fall, rest. ACC proposes to mine through portions of the fences between these two allotments.

### **3.13 Socioeconomics**

The proposed operation is located in Big Horn County, Wyoming. The closest community is the town of Lovell. Lovell is located about one mile south of the proposed Modification area and has a population of 2,367 people. In 2010, the estimated population of Big Horn County was 11,696 people. Communities in Big Horn County include Basin (the county seat), Burlington, Byron, Cowley, Deaver, Emblem, Frannie, Greybull, Hyattville, Shell, Lovell, Manderson, and Otto. Big Horn County covers 3,137 square miles and has a population density of 3.7 people per square mile. Between 1970 and 2010 the County's population grew by 14 percent. Between 2000 and 2011, its population increased by three percent. The area has a strong agricultural economy, which includes farming (corn, sugar beets, alfalfa, barley, beans, hay) and ranching (cattle, sheep, horses).

Data from the State of Wyoming Economic Analysis Division indicate that mining (including oil and gas) accounts for 10.1% of the jobs and 16.1% of the personal income in Big Horn County. In 2013, mining employment provided an average wage per job of \$46,674; approximately 699 people were employed directly by the mining industry (including oil and gas) in the county (WEAD, 2015). ACC has approximately 120 employees working at their Lovell mine and mill. ACC contracts with various Big Horn County service companies to conduct mining activities within their permitted areas. These service companies provide heavy equipment and labor to strip and salvage soil and overburden, expose, mine and haul the clay, and conduct reclamation and seeding.

The State of Wyoming Economic Analysis Division study also shows that farming (including ranching) accounts for 11.1% of the jobs and 8.9% of the personal income in Big Horn County. In 2013, farming employment provided an average wage per job of \$25,737 and employed approximately 767 people (WEAD, 2015). Livestock grazing has been, and continues to be, a major resource-use activity on BLM-administered public lands in the Cody Field Office and around the proposed mining areas analyzed in this EA. Grazing has occurred in the proposed mining area for over 100 years.

This area is also used for recreational purposes, such as hunting, hiking, rock hounding, and off-highway vehicles, as well as for other values such as driving for pleasure in an aesthetically pleasing environment, finding solitude, and wildlife viewing. The Bighorn Basin has an active tourism industry from people visiting Yellowstone National Park and the Bighorn Canyon Recreation Area, among other attractions. The scenery along the way to these areas adds to the enjoyment of both visitors and local residents.

### **3.14 Recreation and Visual Resource Management (VRM)**

The majority of the proposed mine area is located on BLM-administered public lands that have no specific recreation management prescriptions or designations, although recreational use is recognized in the area. Recreational activities observed in the project area include driving for pleasure, OHV use, hunting, hiking, rock hounding, and other similar types of dispersed activities. The recreational setting characteristics in the area are identified as middle and front country, where modifications, such as fences and roads, contrast with the natural character of the landscape. Public lands containing these settings within proximity to Lovell, Wyoming, create a desirable area for local residents to recreate and attain desired experiences and beneficial outcomes.

The proposed mine area is located on BLM-administered public lands identified as Visual Resource Inventory (VRI) Class IV. The area is within a scenic quality rating unit (SQRU) recently inventoried and scored with a scenic quality C rating, low sensitivity levels, and is within the foreground/middle ground distance zone. The SQRU consist of the foothills of the Bighorn Mountains to the east, and expands west to the Bighorn River. The eastern SQRU contains exposed slopes and fairly rugged topography and is dissected by numerous drainages. It is exposed and is in view from the surrounding areas to the extent that any significant surface-disturbing activity would be visible. The unit is an attraction for hunters and other recreationists, as well as important wildlife habitat, particularly for big game species. There is an expectation among Bighorn Basin residents that management should reflect those values.

While the overall visual sensitivity of the SQRU where the proposed mine area is located is rated as low, the public values the area for many other uses including ranching, wildlife habitat, and recreation. Management objectives allocate this area for multiple uses, which are recognized and observed by visitors. VRI Class IV objectives are to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

## **4.0 ENVIRONMENTAL EFFECTS [Direct and Indirect Impacts]**

### **4.1.1 Alternative I - No Action**

#### **4.1.1 AIR QUALITY**

There would be no additional effect on current air quality under Alternative I because the proposed White Rock Modification would not be approved. Particulate matter and other contaminants from exhaust would not be emitted into the air by equipment or haul trucks used in the proposed mining process.

#### **4.1.2 CULTURAL RESOURCES AND NATIVE AMERICAN RELIGIOUS CONCERNS**

Currently, potential impacts to cultural resources include unauthorized surface collection and looting. Additionally, unauthorized off highway vehicle use of the proposed mining modification area has the potential to impact cultural resources. Under the No Action Alternative, these potential impacts would remain at existing levels. There would be no additional impacts on Cultural Resources under Alternative I because surface disturbance under the proposed White Rock Modification would not be approved. No impacts to Native American Religious concerns would occur under the No Action alternative, as the BLM would take no action that would adversely affect these areas or locations.



#### **4.1.3 WATER (SURFACE AND GROUND) AND FLOODPLAINS**

There would be no effect on surface water, groundwater, or floodplains because the proposed White Rock Modification mining would not be approved. Alternative I proposes the least effect on surface water, as there would be no surface disturbance, leaving the vegetation, soil, and natural drainage patterns in place to naturally control surface water.

#### **4.1.4 WETLANDS, RIPARIAN AND AQUATIC RESOURCES**

There would be no effect on wetlands, riparian areas, or other aquatic resources under Alternative I because the proposed White Rock Modification mining would not be approved, so the proposed surface disturbance would not occur.

#### **4.1.5 GEOLOGY AND MINERALS**

There would be no effect on the geology or minerals of the area under Alternative I because the proposed White Rock Modification mining would not be approved, so the proposed surface disturbance would not occur.

#### **4.1.6 PALEONTOLOGICAL RESOURCES**

There would be no effect on paleontological resources under Alternative I because the proposed White Rock Modification mining would not be approved, so the proposed surface disturbance would not occur.

#### **4.1.7 SOILS**

There would be no effect on soils under Alternative I because the proposed White Rock Modification mining would not be approved, so the proposed surface disturbance would not occur.

#### **4.1.8 VEGETATION**

There would be no effect on vegetation under Alternative I because the proposed White Rock Modification mining would not be approved, so the proposed surface disturbance would not occur.

#### **4.1.9 INVASIVE, NON-NATIVE PLANT SPECIES**

There would be no new effects of invasive and non-native species under Alternative I because the proposed White Rock Modification mining would not be approved. By choosing Alternative I there would be less chance that this area would be affected by invasive weed species, as no new disturbance would occur.

#### **4.1.10 WILDLIFE, MIGRATORY BIRDS AND RAPTORS**

There would be no effect on wildlife under Alternative I because the proposed White Rock Modification mining would not be approved. Wildlife use of the area would continue at current levels because the disturbance and habitat loss would not occur. There would be no effect on migratory birds or raptors under Alternative I because the proposed White Rock Modification mining would not be approved. Habitat would not be disturbed by mining.

#### **4.1.11 THREATENED AND ENDANGERED SPECIES AND BLM SENSITIVE SPECIES**

There are no known Threatened or Endangered species located in the proposed mining area and there would be no effect on these species. Also, BLM Sensitive Species, such as the mountain plover, would not lose any habitat or potential suitable habitat.

#### **4.1.12 LIVESTOCK GRAZING AND RANGE MANAGEMENT**

There would be no effect on livestock, grazing, or range because the proposed White Rock Modification mining would not be approved. Cattle grazing in the area would not decrease and the forage would not change to post-mining vegetation species.

#### **4.1.13 SOCIOECONOMICS**

There would be an affect to employees of ACC and its contractors if Alternative I was selected because the company would not have approval to mine the bentonite resource in the proposed mine area. The supply of bentonite may be reduced, potentially causing a rise in the price of bentonite products, affecting those who use them. No impact to agriculture would occur. If the proposed mine plan were not approved, the many recreation activities in the area, such as hunting, wildlife viewing, and driving for pleasure would not be affected. The area's scenery and solitude values would also be unaffected under Alternative I.

#### **4.1.14 RECREATION AND VISUAL RESOURCE MANAGEMENT (VRM)**

There would be no effect on recreation or VRM because the proposed White Rock Modification mining would not be approved. No resulting effects on recreation or VRM would be expected to occur beyond the current situation.

### **4.2 Alternative II - Proposed Action**

#### **4.2.1 AIR QUALITY**

The air quality of the surrounding area would be impacted for the ten-year life of the mine due to the implementation of the Proposed Action. Elevated amounts of dust could continue to be generated even after the proposed mine area would be reclaimed until vegetation is reestablished. Soil and overburden stripping, and bentonite mining and hauling would result in an increase in the amount of particulate matter, fugitive dust, and fossil fuel combustion-related air pollution (soot, CO<sub>2</sub>, CO, and O<sub>3</sub>) entering the air in the local area.

Dust suppression measures would be required of ACC, in order to control fugitive dust emissions. These measures would include the application of dust suppression water or other BLM-approved dust suppressants to the mine area and haul roads, using water trucks as needed, during mining and hauling activities. In areas that have been reclaimed but have not fully revegetated, dust would be kicked up by wind until enough vegetation was present to stabilize soils and particulates. Trucks on the haul roads would continue to increase the amount of dust in the air until the roads were reclaimed or were no longer used as haul roads. There would be no proposed mitigation for the release of combustion-related byproducts of operating heavy equipment and haul trucks to mine and transport the bentonite.

The Air Quality Standard #6 (Air Quality) for Healthy Rangelands in Wyoming would fall below the threshold to meet the standard if the WDEQ determined that the air quality in the area was impaired. The source of the problem causing the standard to be failed could be due to the proposed mine activities, other area causes, or a combination of both. If the air quality would be impaired and the proposed mining would be found to be the cause, BMP's would be implemented.

#### **4.2.2 CULTURAL AND HISTORICAL RESOURCES AND NATIVE AMERICAN RELIGIOUS CONCERNS**

Potential impacts from the Proposed Action may include disturbance of previously undetected, buried cultural remains through construction activities. ACC would be required to report these as required in the Cultural Resources Stipulations in Section 4.3.2. Additional potential impacts to cultural resources include unauthorized surface collection and looting of buried materials. Improved access roads would facilitate travel in the area, which may increase the number of people visiting the area, and the potential for unauthorized surface collection and looting. If any areas or locations of traditional gathering areas, religious, or cultural concern to Native Americans are subsequently identified or become known through the Native American notification or consultation process, they would be considered during the implementation phase. The BLM would take no action that would adversely affect these areas or locations without consultation with the appropriate Native American tribes.

#### **4.2.3 WATER (SURFACE AND GROUND) AND FLOODPLAINS**

Surface water could be affected temporarily and locally by the Proposed Action. During the proposed mining process natural drainage patterns would be temporarily disrupted, altering drainages and modifying overland and subsurface flow. Due to the loss of vegetation, biological crusts, and desert pavement, run-off from the proposed mining areas may transport more sediment, water, and other pollutants to downstream water features than before the area was mined. Runoff from the mine area also may be more acidic and salty than pre-disturbance runoff due to the acidic and salty sub-soils exposed by mining. Larger ephemeral channels would be temporarily directed around open pits during active mining stages.

In order to control sediment and runoff under the Proposed Action, water bars, sediment fences and/or certified weed-free straw bale check dams would be used for erosion control. Berms would be installed around pits and haul roads. Through drainage would be required to be reestablished during final reclamation. Channel design for both temporary and permanent diversions would match pre-mine channel gradients and cross-sectional shapes and dimensions. After reclamation, drainage would temporarily be affected until vegetation and soils recover to pre-mine conditions.

Floodplains could be affected by the proposed mining. The proposed mining area would be bermed until the reclamation process begins (recontouring, topsoiling, and reseeding) in order to prevent water run-off and sediment from leaving the pit and open mining area and flowing out into the floodplain. Water diversions created during the mining process would allow water to flow around the proposed mining area. Floodplains also would be affected during the reclamation process; until vegetation establishes and holds the soil and water in place, there would be more overland water flow and sedimentation onto floodplains than there had been prior to the proposed mining. Prior to seeding, ACC would micro-recontour the land surface where possible. This contouring method slows or traps flowing water and sediment, slowing runoff and erosion, creating micro-environments that encourage seed germination and growth.

Groundwater may be affected by the proposed mining either by water infiltration in parts of the proposed mining area or by pollutants in haul road run-off that may find a way into the groundwater. It would not be likely that groundwater would be affected directly through infiltration in the pits which would be 30 to 50 feet deep. Pollutants would have to penetrate through tight shales and bentonites into the water table; therefore water would be more likely to evaporate than to infiltrate.

If a large storm event would exceed the capability of ACC's berms, deleterious material could flow offsite and affect surface and groundwater. Sediment and other pollutants could be transported from the site by wind, water, or mining related activities (bentonite on haul truck tires falling off out of the mine area) could introduce pollutants that may eventually reach the groundwater.

The Wyoming Water Quality Land Health Standard #5 (Water Quality) for Healthy Rangelands of Wyoming would fall below the threshold to meet the standard if the WDEQ determined that watersheds in the area were impaired. The source of the impairment could be due to the proposed mine activities, other area causes, or a combination of both. If the water quality in the area is determined to be impaired and the proposed mining was found to be one of the causative agents, Best Management Practices (BMPs) would be implemented to address the impairment. Water resource mitigation is included in ACC's White Rock Plan Modification submission. ACC would also follow the specifications of their current Storm Water Discharge Permit (SWDP) and Storm Water Pollution Prevention Plan (SWPPP) to comply with Section 401 of the CWA and would coordinate with the U.S. Army Corps of Engineers prior to placing fill in any water feature to facilitate compliance with Section 404 of the CWA.

#### **4.2.4 WETLANDS, RIPARIAN AREAS, AND AQUATIC RESOURCES**

Mitigation that addresses the following potential effects is incorporated in the White Rock Plan Modification submission and ACC's Storm Water Discharge Permit (SWDP) and Storm Water Pollution Prevention Plan (SWPPP). The Proposed Action may affect downstream riparian areas, wetlands, aquatic habitat, and associated biota by modifying the hydrology and sediment regimes of area watersheds. Hydrologic modification may alter peak and base flows, sediment and nutrient regimes, and natural watershed inputs, as well as increasing salts, which would lower the pH (acidity) of the water. Accidental spills of petroleum products or use of herbicides may introduce pollutants into the area.

Invasive, non-native plant species could become established on or near the proposed mine area and spread to downstream or downwind riparian areas, wetlands, and/or aquatic habitat which could weaken plant communities and ultimately system stability and functionality. Upstream riparian areas, wetlands, aquatic habitat, and associated biota could be affected also, if the proposed mining activities cause head-cutting of drainages.

If the riparian-wetland areas associated with the watersheds in the area were determined to be Functioning at Risk or Non-functional, they would fall below the threshold to meet the standard for the Wyoming Riparian-Wetland Land Health Standard #2 for Healthy Rangelands of Wyoming. Failure could be related to the proposed mining activities, other area factors, or a combination of both. If the proposed mining was determined to be a factor contributing to the failure, BMPs would be implemented to address the failure.

#### **4.2.5 GEOLOGY AND MINERALS**

**OVERBURDEN:** If bentonitic overburden comes into contact with subsoil or topsoil during the removal, storage, or the reclamation process, the soil's acidity level would rise and become uninhabitable by plants. When situations like this occur, reclamation can be difficult. Acidic and deleterious overburden would be replaced deeper than the vegetation root zone.

**MINERAL RESOURCES:** Under the Proposed Action, commercial quantities of bentonite would be removed from the Cretaceous Thermopolis Shale, Mowry Shale, and Frontier Formation. Mining would disrupt the natural stratigraphic order of beds within the open pit areas, and disturb overburden, as well as top and subsoil profiles, as described in the mine plan. No other locateable mineral resources would be affected by the Proposed Action. The Proposed Action would have a minimal impact on the very limited saleable mineral resource located on public lands proposed to be mined. There are no active oil and gas leases in the White Rock Modification area. Access to leasable mineral resources would not be impacted as a result of the Proposed Action.

#### **4.2.6 PALEONTOLOGICAL RESOURCES**

Paleontological resources in the proposed mining area may be affected under the Proposed Action, which would involve mining in the Thermopolis Shale, Mowry Shale, and Frontier Formation. These formations are rated as a Potential Fossil Yield Classification (PFYC) of 3a, meaning that they have a "Moderate" potential to contain vertebrate fossils. Standard paleontological stipulations found in Stipulations Section 4.3.2, would be applied to any approval to protect paleontological resources that might be found in the proposed mine area. If scientifically significant fossils (all vertebrate fossils and their tracks or traces, and some invertebrate or plant fossils identified as rare or important by the scientific community) are discovered, ACC would be required to suspend operations that might further disturb such materials, and immediately contact the BLMs Authorized Officer (Cody Field Manager) so the fossil resources could be assessed. Scientifically significant fossil resources would be removed from the area prior to resumption of mining.

#### **4.2.7 SOILS**

Soils that would be disturbed by the proposed mining and related activities would be locally and permanently affected. Some of the biological, physical, and chemical properties of the soil could be preserved better by properly separating and storing suitable topsoil from subsoil, overburden, and especially from bentonite and “ash” stockpiles. If topsoil would be exposed to bentonite or “ash” materials, it would become contaminated and reduce the capacity to support vegetation.

Microorganisms living in the topsoil have a relatively short lifespan when soil is stockpiled due to the lack of oxygen, lack of new organic material, lack of water, and an increase in depth to surface. Topsoil must be redistributed as soon as possible after being stockpiled for the soil to maintain a functioning ecosystem. The presence of these microorganisms in soil reduces water and wind erosion, holds water in the soil, and prevents weed establishment. The castback mining system is designed to quickly reclaim disturbed areas so topsoil remains viable and will more easily support re-vegetation efforts. Live-spreading is currently the best method for reclamation because topsoil that is removed from an open pit is immediately placed on the area that has already been mined, backfilled and recontoured. This preserves many of the topsoil’s important biological and physical qualities.

Loss of topsoil’s biological viability as a result of stripping and stockpiling would increase as the length of stockpiling time increases (loss would occur very rapidly at first and then gradually taper off). WDEQ regulations require that all soil stockpiles be separated from all other material by a buffer zone of at least a bulldozer width to prevent contamination. ACC would attempt to use live-spreading of topsoil whenever possible and would try to stockpile topsoil for as short a time as possible before respreading it. ACC would also seed its topsoil stockpiles to prevent weed growth, reduce erosion, and maintain the soil’s biological integrity.

Areas of rock litter or desert pavement frequently form where wind and water erosion washes away the soil and leaving the rock cap. The cap then prevents further erosion of the soil or subsoil in the area. Once the proposed mining has taken place and the land has been reclaimed, this rock litter layer may no longer be present, increasing the soil on the surface that has the potential to be eroded from the area.

Impacts of the Proposed Action to soils would require mitigation (required by both BLM and WDEQ), as per the terms of any approved mining and reclamation plan and as presented in the White Rock Modification application discussed in Section 2.2. Associated disturbance relative to mining would be kept to a minimum in order to prevent unnecessary and undue disturbance of native soil profiles. The areas would be seeded in a timely manner to promote speedy plant growth and further reduce erosion.

Until successful reclamation of the soil occurs, the disturbed areas would have reduced soil stability and would fall below the threshold to meet Standard #1 (Soils) for Healthy Rangelands in Wyoming.

#### **4.2.8 VEGETATION**

Vegetation in the proposed disturbance footprint would be directly affected by the Proposed Action. Native vegetation and topsoil would be removed in all proposed mining and haul road areas. After mining is complete, subsoil and topsoil would be placed back on the surface. If castback mining proceeds in a timely manner, some of the soil biota and other microorganisms associated with healthy, living soil would still be alive to help the newly planted seeds reestablish. If the topsoil was left sitting in a stockpile for more than a few months, the likelihood that there would be any microbial life left in the soil would be much lower, thus decreasing the ability of the soil to support plant life. The success of the vegetation reclamation depends largely on the timeliness and cleanliness of the topsoil replacement process. Also, future topsoil quality and quantity depends on the establishment of vegetation.

Disturbing up to 291.5 acres would leave areas open to invasive weed species that establish quickly and flourish in disturbed areas. Speedy revegetation with native plants would be necessary to prevent a non-native weed invasion. Due to the low precipitation in this area (five to nine inch precipitation zone) and the presence of very shallow, saline soils, revegetation is often a slow process taking from two to twenty years or more. Any islands of native vegetation left in the mined areas would aid in the spread of native plants throughout the disturbance. If topsoil is livespread, viable native seeds would still be present which would aid in the reestablishment of native vegetation on the reclaimed areas.

Vegetation native to the proposed mining area is adapted to the local climate, soils, native herbivory, and other ecological variables unique to the area to be mined and has. If reclamation is not properly conducted, a different type of plant community could eventually replace native species. Often, even successful reclamation will result in a change from the existing native plant community that occupied the site prior to being disturbed for decades. Until vegetation on disturbed sites consists of plant communities appropriate to the site that are resilient, diverse, and once again able to recover from disturbances, vegetation communities would fall below the threshold to meet Standards #3 (Upland Vegetation) and #4 (Wildlife) for Healthy Rangelands of Wyoming.

Impacts of the Proposed Action to vegetation would require mitigation (required by both BLM and DEQ-LQD), as per the terms of the White Rock Modification mining and reclamation plan, discussed in Section 2.1. According to ACC's proposed reclamation plan, a vegetative community dominated by native shrubs and grasses would be reestablished over time. Mitigation measures would include the use of approved seed mixtures and seeding application rates to help reestablish vegetation over time to pre-mine or better conditions.

All seed used on public lands would be certified to be cheatgrass-seed and noxious weed-free by certified laboratory testing and would conform to BLM seed policy IM No. 2006-073 (Appendix C). Hay or straw used for check-dam construction or mulching would be certified to be cheatgrass and noxious weed-free. Also per IM-2006-073, "Copies of the seed lab test results, including purity and germination (viability) rate, must be forwarded to the appropriate BLM office prior to seed application. If the seed does not meet the BLM and State/Federal standard for noxious weed seed content or other crop seed allowances, it shall not be applied to public land."

Some reclaimed areas may need to be fenced to exclude livestock from grazing too heavily on newly-germinated or established seedlings in these areas. Additional revegetation goals include site stabilization, erosion control, and restoration of visual aesthetics.

#### **4.2.9 INVASIVE, NON-NATIVE PLANT SPECIES**

Invasive and non-native plant species occur in the area of the White Rock Plan Modification and would increase over the short term under the Proposed Action. It is less likely that invasive weed species would establish in the area if seeding is completed soon after mining.

If the reclamation seeding is difficult to establish, annual, invasive and/or non-native weed species would be more likely to spread throughout the disturbed area. Seeding topsoil stockpiles, which would be a required mitigation measure for this Modification, would decrease the potential for weeds to spread to and contaminate topsoil. Some weed species that commonly establish in post-mining areas are as follows: cheatgrass (*Bromus tectorum*), halogeton (*Halogeton glomeratus*), kochia (*Kochia scoparia*), and Russian thistle (*Salsola kali*). If cheatgrass were to establish, it could form a monoculture, outcompeting native species, reducing species diversity, decreasing sagebrush establishment, and creating a volatile fuel source for fires. Halogeton pulls salt to the surface, creating a saline environment few native plants can survive.

Weeds would be controlled/eradicated using BLM-approved methods and herbicides, and their management would be the sole responsibility of ACC. Vegetation would be reestablished and weed-free seeds and hay for mulch would be used in the proposed mining area. Cleaning vehicles, equipment, and materials before they enter public land would help reduce the spread of invasive, non-native plant species.

A list of Wyoming state-listed noxious weeds is provided below (WWPC, 2011). These weeds would need to be controlled should they begin to grow on areas disturbed by mining in the White Rock Modification area. Cheatgrass also would need to be controlled in the proposed project area should it begin to grow in mined or reclaimed areas.

- |   |  |
|---|--|
| 1) Field bindweed ( <i>Convolvulus arvensis</i> L.)           | 14) Musk thistle ( <i>Carduus nutans</i> L.)             |
| 2) Canada thistle ( <i>Cirsium arvense</i> L.)                | 15) Common burdock ( <i>Arctium minus</i> (Hill) Bernh.) |
| 3) Leafy spurge ( <i>Euphorbia esula</i> L.)                  | 16) Plumeless thistle ( <i>Carduus acanthoides</i> L.)   |
| 4) Perennial sowthistle ( <i>Sonchus arvensis</i> L.)         | 17) Dyers woad ( <i>Isatis tinctoria</i> L.)             |
| 5) Quackgrass ( <i>Agropyron repens</i> (L.) Beauv.)          | 18) Houndstongue ( <i>Cynoglossum officinale</i> L.)     |
| 6) Hoary cress ( <i>Cardaria draba &amp; pubescens</i> )      | 19) Spotted knapweed ( <i>Centaurea maculosa</i> Lam.)   |
| 7) Perennial pepperweed ( <i>Lepidium latifolium</i> L.)      | 20) Diffuse knapweed ( <i>Centaurea diffusa</i> Lam.)    |
| 8) Ox-eye daisy ( <i>Chrysanthemum leucanthemum</i> L.)       | 21) Purple loosestrife ( <i>Lythrum salicaria</i> L.)    |
| 9) Skeletonleaf bursage ( <i>Franseria discolor</i> Nutt.)    | 22) Saltcedar ( <i>Tamarix</i> spp.)                     |
| 10) Russian knapweed ( <i>Centaurea repens</i> L.)            | 23) Common St. Johnswort ( <i>Hypericum perforatum</i> ) |
| 11) Yellow toadflax ( <i>Linaria vulgaris</i> L.)             | 24) Common Tansy ( <i>Tanacetum vulgare</i> )            |
| 12) Dalmation toadflax ( <i>Linaria dalmatica</i> (L.) Mill.) | 25) Russian olive ( <i>Elaeagnus angustifolia</i> L.)    |
| 13) Scotch thistle ( <i>Onopordum acanthium</i> L.)           |  |

ACC would be responsible for managing all noxious and undesirable invading plant species in the reclaimed areas, including cheatgrass, Russian olive, and tamarisk, until revegetation activities would be determined to be successful and the bond would be released for a given area. The use of untreated or unfiltered surface water for dust management has the potential to spread undesirable plant species. If noxious or invasive weeds are encountered, the BLM and/or the Big Horn County Weed and Pest Department would be consulted by ACC for control and eradication methods. A Pesticide Use Proposal (PUP) and written approval from the BLM Authorized Officer for the use of herbicides would be obtained prior to the use of herbicides on public land.

#### **4.2.10 WILDLIFE, MIGRATORY BIRDS, AND RAPTORS**

**WILDLIFE:** The Proposed Action would affect wildlife that live near or move through the proposed mining area. It may also affect the flora and fauna that use aquatic and semi-aquatic environments within and downstream of the proposed mining area. Movement through the area would become difficult as pits appear and disappear in places animals may have used to travel. Larger wildlife species, such as mule deer, pronghorn, and coyotes, would have to adapt and change their movement patterns to avoid the proposed mining area during the proposed mining operation. Large areas of suitable habitat exist on public lands surrounding the mining areas to which game animals can move; big game populations would be affected by fragmentation and disruption from mining activities. The habitat in and around the area to be mined would become less suitable until reclamation is successful.

Smaller animals, amphibians and reptiles whose home range is much smaller would be affected by the Proposed Action. Displaced animals would have to move to a new area, which may already be fully occupied, resulting in stress, extra competition, and probable mortality. An unknown number of these small animals would be lost during the mining either directly by machinery or indirectly through habitat loss; their numbers would probably not rise to current levels again until the habitat in the disturbed area would be fully reclaimed to pre-mine conditions. Their returned presence in the reclaimed area would help increase the aeration and permeability of the soil and improve the overall health of the soils and vegetation.



If the Proposed Action is approved and implemented, wildlife would likely avoid the area until reclamation is successful. If the vegetative community is drastically changed post-mining, wildlife species using the area likely would change as well. The change in vegetative community from pre-mine conditions to post-mine conditions may result in a shift to plant species not specifically adapted to the local site and would provide different and lesser quality of habitat across all acres affected.

**RAPTORS:** The Proposed Action would affect golden eagles that nest in the area. Proposed mining temporarily would alter nearby hunting areas. This would be a factor until the affected area is reclaimed and small prey species have returned. ACC would monitor the area for raptors between February 1st and July 31st and notify the BLM if any nesting raptors would be affected. Mining would stop if nesting birds are detected within one half mile until the birds have fledged and can leave the nesting area, unless a mitigation plan is developed with the BLM and the USFWS. A mitigation plan would provide short term protection of the habitat only; over the long term, this habitat would be degraded until reclamation is substantially complete. No mining activity would occur within ½ mile of the known White Rock golden eagle nest along Dry Creek between January 15th and July 31st. If monitoring shows the nest is vacant for the year, ACC would consult with the BLM and USFWS to determine if mining operations within ½ mile of the nest could commence.

**OTHER MIGRATORY BIRDS:** Migratory birds, including sagebrush obligate species, would avoid the area until successful reclamation is achieved. Assuming the area would be fully reclaimed to conditions similar to pre-mining at some point in the future, the habitat would once again be suitable for these species. In conformance with the BLM and USFWS suggestions, ACC would conduct nest searches in migratory bird habitat prior to and during ground disturbing activities between April 10th and July 15th. If nesting migratory birds are found, mining operations would halt until the BLM and the USFWS are consulted for further action. ACC would implement mitigation and monitoring measures developed with the BLM and USFWS to prevent take of migratory birds and to comply with the Migratory Bird Treaty Act.

#### **4.2.11 THREATENED & ENDANGERED SPECIES AND BLM SENSITIVE SPECIES**

**THREATENED & ENDANGERED SPECIES:** No Threatened or Endangered plant or animal species (lynx, grey wolf, grizzly bear, black-footed ferret and Ute ladies'-tresses) or Candidate species are known to exist in the area and therefore would not be affected by the Proposed Action. There is potential for Ute ladies'-tresses to be in the area, although no population has ever been observed in the Bighorn Basin. The proposed mining would not occur in riparian areas, specifically wet floodplains that are commonly inundated, where these plants grow, thus making the potential to impact these plants extremely low.

**BLM SENSITIVE SPECIES:** The Proposed Action would remove or impact habitat and cause fragmentation and wildlife avoidance of larger habitat areas for several BLM Sensitive Species, including the following: mountain plover, sage sparrow, Brewer's sparrow, sage thrasher, loggerhead shrike, white-tailed prairie dog, and greater sage-grouse. Assuming the area is fully reclaimed to conditions similar to pre-mining at some point in the future, the habitat may once again be suitable for these BLM Sensitive Species although possibly not as suitable as it was before it was mined based on the success of the proposed mitigation. Habitat would also be fragmented, making adjacent habitat less suitable. Additional weeds, disturbance, human activity, changes in water quality, modified hydrologic and sediment regimes, and habitat destruction would have negative impacts on BLM Sensitive Species.

The area is general sage-grouse habitat; no sage-grouse were observed in the proposed mine area during wildlife surveys and the nearest lek is 14 miles away. The Proposed Action would temporarily and locally remove sage-grouse habitat until reclamation is complete.

The Proposed Action would remove mountain plover habitat until reclamation of the mined area was complete. Full reclamation of area habitat would take years. Mountain plovers are a BLM Sensitive species and are protected under the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703. ACC would conduct nest searches in mountain plover habitat prior to and during ground disturbing activities between April 10th and July 15th. If nesting mountain plovers are found, mining operations would halt until BLM and USFWS are consulted for further action. Through this monitoring, mountain plovers and other migratory birds likely would not be harmed during the proposed mining process.

Past and present bentonite mining can contribute to a grazing allotment falling below the threshold of Standard #4 (Wildlife) for Healthy Rangelands of Wyoming if the rangeland fails to maintain adequate habitat conditions that support diverse plant and animal species. Indicators of Standard #4 may include but are not limited to noxious weeds, species diversity, age class distribution, population trends, and habitat fragmentation.

#### **4.2.12 LIVESTOCK GRAZING AND RANGE MANAGEMENT**

The Proposed Action would temporarily affect 291.5 acres of rangelands in the proposed mining area. It is likely that one to five AUMS (600 to 800lbs of dry weight vegetation) could be lost each year until revegetation occurs on some or all of the acres disturbed. It is anticipated that vegetation would reestablish following reclamation, but at an unknown rate when considering site potential and other environmental influences. Since castback mining takes place in stages, the areas disturbed first would be the furthest along in the reclamation process. Reclamation could be successful if topsoil is handled properly and drought conditions do not make it exceptionally difficult for seedlings to germinate and grow. After the reseeding is successful, which could take years, vegetation would be reestablished well enough to provide forage for livestock once again.

ACC is proposing to mine through an existing allotment boundary fence; the company would work with the BLM-CYFO to maintain the fence's integrity or construct a temporary fence to prevent trespass livestock issues during the proposed mining and reclamation and restore it before completing the mining process.

Usually reclaimed mining areas are not fenced out of grazing allotments. Because of this, cattle rarely are prevented from grazing on reclaimed lands where seeds are trying to germinate and establish. This can be detrimental to both grazing and the mine reclamation effort. Grazing before plants have become established stresses seedlings and makes it very difficult for them to survive, spread, or create healthy rangeland. Livestock often pull up small plants and seedlings. Grazing during the early stages of revegetation can lead to an increase of weed growth; native seeds in the seed mix are more desirable to cattle and are quickly grazed off, leaving the barren area open to possible establishment by weeds. ACC may install temporary fences around seeded areas that are in locations used heavily by cattle, in order to give seedlings a chance to establish. ACC would be responsible for installation, maintenance, and removal of these reclamation fences. ACC would be responsible for successful reseeding and would be held accountable for the reseeding by WDEQ-LQD and the BLM until an acceptable vegetative community has established.

#### **4.2.13 SOCIOECONOMICS**

Under the Proposed Action, the proposed White Rock Plan Modification would be approved and bentonite mining would proceed into the proposed mining area. The proposed mining area would be a job site for ACC employees and contractors in future years once ACC begins mining the area. AUMs available for livestock grazing would be temporarily reduced, as bentonite mining would remove available forage until the mined areas are successfully reclaimed. Over time, the grazing allotments would temporarily lose dozens of AUMs until successful reclamation would be achieved. The proposed action could temporarily disturb some recreational uses in the area. The mine would temporarily affect the immediate view from nearby roads for those appreciating local scenery near the proposed mine area until reclamation is successful. Wildlife viewing and hunting may be reduced in the short term, though post-reclamation or during non-disruptive activities, wildlife may still use the area. Over time, some recreational activities could improve with successful reclamation.

#### **4.2.14 RECREATION AND VISUAL RESOURCE MANAGEMENT (VRM)**

RECREATION: Mining would reduce the opportunities for local recreationists to enjoy the area's resources and activities such as ATV use, hunting, hiking, rock hounding, exploring, and sightseeing on 147.4 acres of public land. The middle to front country settings may be altered to more urban settings due to the mining activities and the change in the natural landscape. This setting characteristic alteration may discourage and displace users to alternative areas who traditionally attain desired experiences and beneficial outcomes within the project area. Mitigation measures prescribed by other resource programs may benefit recreational settings, of which may minimize impacts to recreational experiences and beneficial outcomes.

VRM: The proposed project would impact visual resources by altering the natural elements of form, line, color, and texture exhibited from the landscape. Visual impacts could be observed by those traveling the bentonite haul roads that intersect the project area. Surface disturbing activities would be noticed by the degree of contrasts against the surrounding natural elements. Reclamation of mined lands could mitigate these effects over time.

The general area is managed under VRM Class IV objectives, which provide for activities that require moderate to major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high in Class IV where activities may dominate the view and be the major focus of viewer attention. Reclamation practices utilized by ACC would minimize immediate contrasting elements caused by surface disturbing activities, but the proposed mining activity could introduce a high degree of contrast against the surrounding natural elements.

### **4.3 Mitigation, Monitoring and Stipulations**

The following items are mitigation measures and monitoring requirements that would be attached to any approval of the Proposed Action and are included in the White Rock Modification:

#### **4.3.1 MITIGATION AND MONITORING**

##### ***Air Quality***

To control fugitive dust generated by haul trucks, roads will be kept watered by using a truck equipped with a spray bar or other BLM approved method.

### ***Water Quality and Riparian-Wetland Area Management***

ACC will obtain authorization from the U.S. Army Corps of Engineers prior to disturbing waters of the United States. ACC also will obtain, maintain, and implement any Storm Water Discharge Permit (SWDP) and associated Storm Water Pollution Prevention Plan (SWPPP) required by the WDEQ-WQD, per Section 401 of the CWA in the State of Wyoming.

Modification of the hydrology of riparian and wetland areas, including jurisdictional waters of the United States, will be avoided whenever possible. Where hydrology is modified, through drainage will be required to be reestablished during final reclamation. Channel design for both temporary and permanent diversions will match pre-mine channel gradients and cross-sectional dimensions. In order to control sediment and runoff under the Proposed Action, fabric fences or certified weed-free straw bale check dams will be installed at discharge points into natural channels. Berms will be installed around pits and haul roads. No mining will occur within 100 feet of the Shoshone River bluffs. No equipment will be serviced or fueled within at least 300 feet of the riparian areas present in the area.

### ***Reclamation Seed Mix***

Within two to five years following the mining of bentonite, the White Rock Plan Modification will be recontoured, deep ripped, and seeded using one of the two seed mixes listed with potential substitute species from their respective alternate species lists. ACC's proposed seed mixes are listed below. The "Standard Seed Mix" and its alternate species list will be used where Gardner saltbush was dominant in the pre-mine vegetation and the "Big Sagebrush Seed Mix" and its alternate species list will be used where Wyoming big sagebrush was dominant in the pre-mine vegetation communities. Areas with topography prone to holding moisture will be targeted with 1.0 lbs PLS/acre Wyoming big sagebrush to reestablish sagebrush islands present in pre-mine vegetation communities.

The PLS seeding rates are based on broadcast seeding. If drill seeding methods are used, the rate will be reduced by 30 to 40 percent, except for Wyoming big sagebrush.

#### **(1) ACC's Standard Seed Mix**

<u>Seed Species</u>	<u>Rate-lb PLS/acre</u>
Indian Ricegrass ( <i>Oryzopsis hymenoides</i> )	1.25
Bottlebrush Squirreltail ( <i>Elymus elymoides</i> )	3.0
Western Wheatgrass ( <i>Pascopyrum smithii</i> )	2.0
Sandberg Bluegrass ( <i>Poa Secunda</i> )	1.0
Bluebunch Wheatgrass ( <i>Pseudoroegneria spicata</i> )	2.0
Sand Dropseed ( <i>Sporobolus cryptandrus</i> )	0.1
Fringed Sagebrush ( <i>Artemisia frigida</i> )	0.5
'Natrona' Fourwing Saltbush ( <i>Atriplex canescens</i> )	4.0
Shadscale ( <i>Atriplex confertifolia</i> )	2.0
Gardner Saltbush ( <i>Atriplex gardneri</i> )	4.0
Rubber Rabbitbrush ( <i>Ericameria nauseosa</i> )	0.5
Rocky Mountain Beeplant ( <i>Cleome serrulata</i> )	0.5
Annual Sunflower ( <i>Helianthus annuus</i> )	1.0
Blue Flax ( <i>Linum lewisii</i> )	0.5
Scarlet Globemallow ( <i>Sphaeralcea coccinea</i> )	0.5
	22.85 lb PLS/acre

**ACC's Alternate Species List for the Standard Seed Mix**

Seed Species	Rate-lb PLS/acre
Thickspike Wheatgrass ( <i>Elymus lanceolatus lanceolatus</i> )	2.0
'Pryor' Slender Wheatgrass ( <i>Elymus trachycaulus</i> )	2.0
Great Basin Wildrye ( <i>Leymus cinereus</i> )	2.0
Russian Wildrye ( <i>Psathyrostachys juncea</i> )	2.0 – private land only
Alkali Sacaton ( <i>Sporobolus airoides</i> )	0.5
Big Sagebrush ( <i>Artemisia tridentata</i> )	1.0
Winterfat ( <i>Krascheninnikovia lanata</i> )	0.5
Western Yarrow ( <i>Achillea millefolium</i> )	1.0
Northern Sweetvetch ( <i>Hedysarum boreale</i> )	0.5
Desert Parsley ( <i>Lomatium spp.</i> )	0.5
Yellow Sweetclover ( <i>Melilotus officinalis</i> )	0.5 – private land only
American Vetch ( <i>Vicia americana</i> )	1.0

**(2) ACC's Big Sagebrush Seed Mix**

Seed Species	Rate-lb PLS/acre
Bottlebrush Squirreltail ( <i>Elymus elymoides</i> )	2.5
Thickspike Wheatgrass ( <i>Elymus lanceolatus lanceolatus</i> )	1.0
Sandberg Bluegrass ( <i>Poa secunda</i> )	1.0
Bluebunch Wheatgrass ( <i>Pseudoroegneria spicata</i> )	1.0
Sand Dropseed ( <i>Sporobolus cryptandrus</i> )	0.1
Fringed Sagebrush ( <i>Artemisia frigida</i> )	0.5
Wyoming Big Sagebrush ( <i>Artemisia tridentata</i> )	1.0
Fourwing Saltbush ( <i>Atriplex canescens</i> )	3.0
Shadscale ( <i>Atriplex confertifolia</i> )	2.0
Gardner Saltbush ( <i>Atriplex gardneri</i> )	4.0
Winterfat ( <i>Krascheninnikovia lanata</i> )	0.5
Rocky Mountain Beeplant ( <i>Cleome serrulata</i> )	0.5
Annual Sunflower ( <i>Helianthus annuus</i> )	0.5
Scarlet Globemallow ( <i>Sphaeralcea coccinea</i> )	0.5
American Vetch ( <i>Vicia americana</i> )	0.5
18.6 lb PLS/acre	

**ACC's Alternate Species List for the Big Sagebrush Seed Mix**

Seed Species	Rate-lb PLS/acre
Indian Ricegrass ( <i>Oryzopsis hymenoides</i> )	1.0
Streambank Wheatgrass ( <i>Elymus lanceolatus riparius</i> )	1.0
'Pryor' Slender Wheatgrass ( <i>Elymus trachycaulus</i> )	1.0
Great Basin Wildrye ( <i>Leymus cinereus</i> )	1.0
Western Wheatgrass ( <i>Pascopyrum smithii</i> )	2.0
Russian Wildrye ( <i>Psathyrostachys juncea</i> )	1.0 – private land only
Alkali Sacaton ( <i>Sporobolus airoides</i> )	0.5
Rubber Rabbitbrush ( <i>Ericameria nauseosa</i> )	0.5
Western Yarrow ( <i>Achillea millefolium</i> )	0.5
Northern Sweetvetch ( <i>Hedysarum boreale</i> )	0.5
Blue Flax ( <i>Linum lewisii</i> )	0.5
Desert Parsley ( <i>Lomatium spp.</i> )	0.5
Yellow Sweetclover ( <i>Melilotus officinalis</i> )	0.5 – private land only

Variations on the proposed mix or listed substitutions will have prior approval from WDEQ-LQD and the BLM. Limited seeding will occur in badlands where no topsoil has been replaced. These areas will be graded to blend in with surrounding reclamation and native topography; swales and depressions that will accumulate moisture and support vegetation will be seeded with any of the following: black greasewood, big sagebrush, or rabbitbrush at a rate of 1.0 lb PLS/acre.

Plains cottonwood (*Populus deltoids*) and various willow species exist within the proposed mine area. Any trees with a diameter at breast height equal to or greater than four inches will be replaced with identical species. Targeted planting of willow species also may occur.

The amount of seed applied to public land will be calculated using the Pure Live Seed (PLS) ratio for each seed lot used. The PLS ratio is derived by multiplying a seed lot's purity by its germination rate (example: 0.95 purity x 0.95 germination = 0.9 PLS ratio). Thus, to have two pounds PLS of Indian ricegrass in a mix, divide "two" by the PLS ratio that was determined for the lot of Indian ricegrass seed being used. The result equals the amount of bulk seed needed which will always be greater than the pounds of PLS desired. (Example: if 2 lbs of PLS Indian ricegrass seed is needed divide 2 by the PLS ratio for the lot of Indian ricegrass seed being used, i.e.,  $2/0.9 = 2.2$  lbs bulk seed is needed.) PLS ratios will be determined for each seed lot to be used in a specific mix to determine the amount of bulk seed that is needed. Seed will be stored properly to preserve its viability and will be used within twelve months of the most recent viability test. Seed stored longer than twelve months beyond the last viability test will be tested for viability again and the bulk pounds/acre rates will be adjusted to reflect any new PLS values before being applied to public land. All seed applied on BLM administered public lands will comply with the current BLM seed policy in WO IM-2006-073 (see Appendix C).

Copies of the seed lab test results, including purity and germination (viability) rate, must be forwarded to the appropriate BLM office prior to seed application. If the seed does not meet the BLM and State/Federal standard for noxious weed seed content or other crop seed allowances, it shall not be applied to public land.

Seeding will take place between October 1st and mid-April. While late fall is the preferred planting season, weather conditions and the number of acres scheduled for seeding would largely dictate the actual time of seeding in any given year. Seeding will occur during the first fall/winter after topsoil has been replaced. All seed will be certified to be cheatgrass and noxious weed seed-free. If ACC decides to try mulching, they must first contact the BLM for approval.

### ***Reclamation and Visual Aesthetics***

Reclamation will be concurrent with mining as much as possible. After mining, disturbed areas under this Modification will be contoured to blend in with the adjacent surroundings and reseeded to support vegetation similar to the native vegetation present before it was mined. Proper topsoil and subsoil salvage is essential to ensure successful reclamation. Use of mine pits for bentonite drying will be kept to a minimum so that pits can be backfilled, recontoured and reseeded in a timely manner. Unnecessary and undue degradation of native soils and vegetation and other public resources will not be allowed to occur as a result of bentonite mining under this Modification. Within 2-5 years following completion of mining, disturbed areas will be recontoured to match the surrounding topography, reestablish drainages, and minimize erosion. The entire disturbed area with the exception of the main haul roads will be topsoiled and seeded using the seed mixes provided previously in this document. If necessary, topsoil stockpiles will be seeded in the fall or spring following placement.

### ***Livestock Grazing Management***

ACC will work with the BLM-CYFO to maintain the allotment boundary fence between the North Shoshone and Black Draw allotments. A temporary fence or fence realignment will be constructed along the allotment boundary where the proposed mining will disturb the existing fence. ACC will work with the BLM-CYFO to replace the allotment boundary fence that runs through the Modification area before completing reclamation. Reconstructed fences will be built to a BLM-standard four-wire fence where the top three wires are barbed and the bottom is a smooth wire that is, at a minimum, 16 inches off the ground.

### ***BLM Sensitive Wildlife Species, Raptors and Migratory Birds***

As a precaution to not cause illegal “take” of protected species under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, ACC will conduct nest searches within 72 hours of disturbance of previously undisturbed areas for migratory birds and BLM Sensitive Species (which include mountain plover and greater sage-grouse) between April 10th and July 15th. Between February 1st and July 31st, ACC will monitor existing nests and potential nesting habitat in the area (highwalls, cliffs, and trees) within 0.5 miles of the disturbance for nesting raptors and within 1 mile for nesting bald eagles. Mining will stop if nesting birds are detected until the birds have fledged and can leave the nesting area unless an appropriate mitigation plan is developed with the BLM and the USFWS. No mining activity will occur within ½ mile of the known White Rock golden eagle nest along Dry Creek between January 15th and July 31st. If monitoring shows the nest is vacant for the year, ACC will consult the BLM and USFWS to determine if mining operations within ½ mile of the nest can commence prior to July 31st.

### ***Noxious or Invasive Weeds***

ACC will be responsible for preventing and managing all noxious and undesirable invading plant species in the disturbed areas including, but not limited to, cheatgrass, Russian olive, and tamarisk, until the revegetation activities have been determined to be successful and the bond has been released for a given area. If noxious or invasive weeds are encountered, the BLM and Big Horn County Weed and Pest will be consulted by the operator for control and eradication methods. Written approval of the Pesticide Use Proposal submitted by ACC from the BLM Authorized Officer must be obtained prior to using herbicides on public land. Newly arriving equipment will be cleaned free of plant material off-site prior to arriving at the White Rock Modification area. Use of untreated or unfiltered surface water may spread undesirable plant species. Certified noxious weed-free and cheatgrass-free seed will be used to seed the area during reclamation.

### ***Aquatic Invasive Species (AIS)***

Care will be taken to ensure that the spread of AIS is prevented. AIS can be spread by equipment that has been used in association with surface water, such as haul road watering equipment. Any such equipment known to have been used in a high risk infected water (a water known to contain Dreissenid mussels) will be inspected by an authorized aquatic invasive species inspector recognized by the state of Wyoming prior to allowing the equipment to enter the area. Any such equipment transported to the area from a different state between March and November (regardless of where it was last used) will be inspected as necessary by an authorized aquatic invasive species inspector prior to allowing the equipment to enter the area. If AIS are found on equipment, it will be decontaminated by an authorized invasive species inspector prior to entering the area. Additionally, if such equipment is moved from one 4th level (8-digit) Hydrological Unit Code watershed to another within the state, the following guidelines will be followed as necessary: all water will be drained from the equipment; plants, mud, and debris will be cleaned from the equipment; and the equipment will be allowed to properly dry.

## **4.3.2 STIPULATIONS**

Stipulations relative to the Proposed Action are discussed below. The best mitigation for the site has been included in the Proposed Action and described above. (Note: The Authorized Officer as referred to below is the Field Manager of the BLM Cody Field Office)

### **Cultural Resources Mining Stipulations (compatible with the current 43 CFR 3809 regulations):**

The operator is responsible for informing all persons associated with this project that they may be subject to prosecution for knowingly disturbing, altering, injuring, excavating, removing or destroying any historical or archaeological site, structure, building, or object on Federal lands.



The operator shall immediately bring to the attention of the Authorized Officer any cultural resources that might be altered or destroyed on Federal lands by his/her operations. If archaeological, historical, or Native American resources are discovered, the operator is to suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Any such discovery shall be left intact until the operator is told to proceed by the Authorized Officer.

The Authorized Officer shall evaluate the discoveries brought to his/her attention, take action to protect or remove the resource, and allow operations to proceed within 10 working days after notification to the Authorized Officer of such discovery. The decision as to the appropriate measures to mitigate adverse effects to cultural or paleontological resources shall be made by the Authorized Officer after consulting with the operator.

Before a Plan of Operations is approved, the operator is responsible for the cost of any investigations necessary and any mitigation measures required by the Authorized Officer. The Authorized Officer will provide technical and procedural guidelines for the conduct of the required evaluation and mitigation. After the Plan of Operations is approved, or where a Plan of Operations is not involved, the Federal Government (BLM) shall have the responsibility and bear the cost of investigations and salvage of any cultural (and paleontological) values discovered by the operator.

#### **Archaeological Resources Protection Act**

No person may excavate, remove, damage, or otherwise alter or deface or attempt to excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands or Indian lands unless such activity is pursuant to an issued permit.

**Human Remains:** If human remains are discovered or suspected, the operator shall suspend operations immediately, physically guard the area, and notify BLM immediately.

#### **Paleontological Resources Mining Stipulations (compatible with the current 43 CFR 3809 regulations):**

1. **Collecting:** The project operator is responsible for informing all persons associated with this project including employees, contractors, and subcontractors under their direction that they shall be subject to prosecution for damaging, altering, excavating or removing any vertebrate fossils or other scientifically significant paleontological resources from the project area. Collection of vertebrate fossils (bones, teeth, turtle shells) or other scientifically significant paleontological resources is prohibited without a permit. Unlawful removal, damage, or vandalism of paleontological resources will be prosecuted by federal law enforcement personnel.

2. **Discovery:** If vertebrate or other scientifically significant paleontological resources (fossils) are discovered on BLM-administered land during operations, the Operator shall suspend operations that could disturb the materials, stabilize and protect the site, and immediately contact the BLM Cody Field Office Manager (Authorized Officer).

3. **Avoidance:** All vertebrate or scientifically significant paleontological resources found as a result of the project/action will be avoided during operations. Avoidance in this case means, “No action or disturbance within a distance of at least 100 feet of the outer edge of the paleontological locality.”

## **4.4 Cumulative Impacts**

Cumulative impacts are discussed in the Final Environmental Impact Statement for the *Proposed RMP* (May 2015). Typical activities are described in that document and are incorporated by reference into this environmental analysis. Cumulative impacts are those that would result from the incremental impacts of the Proposed Action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. These reasonably foreseeable future actions are not part of the Proposed Action, but are projections being made so that future impacts, cumulative and otherwise, can be estimated. The geographic area analyzed for this Cumulative Effects Analysis (CEA) spans approximately three miles in each direction around the proposed mine area (Figures 6, 7, and 8).

### **4.4.1 PAST, PRESENT, REASONABLY FORESEEABLE FUTURE ACTIONS, AND INCREMENTAL EFFECTS**

Past, present and reasonably foreseeable future actions in the general CEA area are bentonite mining and livestock grazing. Therefore, these two major activities are discussed below as the primary land uses under analysis. The area also sustains recreational activities such as hunting, off-highway vehicle use, and other activities, though these are not discussed below as they are not considered among the primary surface-disturbing land uses. Cumulative effects are discussed below both generally for the eastern portion of the Cody Field Office, and for a more specific CEA area. The general analysis area selected for the CEA includes an area of approximately 6.5 miles in diameter, 33.2 square miles, or 21,248 acres out radially from the area of the Proposed Action (Figures 6, 7, and 8).

#### ***Past Actions:***

**BENTONITE MINING:** There are currently four companies mining bentonite in the Cody Field Office; according to the 2014 Annual Reports of these four mine companies, approximately 18,000 acres have been directly affected by bentonite mining. Mine company annual reports estimate that 13,400 acres (74%) of the 18,000 acres have been reclaimed and reseeded; around 925 acres (5%) were mined prior to the establishment of federal and state environmental law and were reclaimed by the Abandoned Mine Lands program; leaving the balance (3,675 acres or 21%) as active mining areas or areas that have been mined but are pending reclamation. About 21% of all areas that have been disturbed by bentonite mining have been released from bond in the field office; approximately 11% of land disturbed by ACC has been applied for and released from bond. Reclamation success has not kept pace with mining disturbance. Within the CEA area, Wyo-Ben mined nearly 50 acres in the 1980s and ACC mined approximately 70 acres over the last three decades.

**LIVESTOCK GRAZING:** Livestock grazing has been, and continues to be, a major resource-use activity on BLM-administered public lands in the Cody Field Office and around the proposed mining area. BLM grazing allotments are located throughout the entire field office, and grazing by cattle and sheep has occurred in the area for over 100 years. It is difficult to quantify the actual direct and indirect impact that livestock grazing has had on the landscape because much grazing occurred prior to BLM quantifying grazing conditions. Improper grazing practices can have long-term effects to vegetative communities, including reduced species diversity, altered species composition, altered vegetative structure, altered abiotic processes (e.g., mean fire return interval), loss of topsoil, and increased invasibility of sagebrush communities. In the eighties and nineties, the livestock grazing was changed in the North Shoshone and Black Draw allotments and rotational grazing strategies, reductions in authorized use, and utilization limits for key plant species were implemented.

These management changes have provided for adequate plant recovery time and leave ample residual vegetation following livestock grazing for watershed protection and wildlife habitat needs.

***Present Actions:***

**BENTONITE MINING:** ACC has affected a total of 3,400 acres of land in the Cody Field Office area; about 2,450 acres (72%) have been reseeded and reclaimed and approximately 11% are bond released by the Wyoming Department of Environmental Quality (WDEQ) and the BLM. Bentonite mining disturbs dozens of new acres of land in the area each year. Since reclamation is attempted to be concurrent with mining, companies try to reclaim as they progress. The White Rock Modification area is located within the North Shoshone and Black Draw allotments, which would temporarily lose up to two (North Shoshone) and ten (Black Draw) AUMs per year until reclamation from the White Rock Modification would be successful. Currently in the North Shoshone Allotment, there are about 640 acres of land already disturbed by bentonite mining, 135 acres of bond released reclamation, 330 acres of approved mining that has not yet occurred, and 90 acres of proposed mining. In the Black Draw Allotment, there has been no land disturbed by bentonite mining and 200 acres of new mining proposed under the White Rock Modification. Collectively for these allotments, combining the current as well as the planned mined acres and considering a worst case scenario, mining would reduce potential livestock forage by 12 AUMs per year if all acres were disturbed concurrently. However, it is anticipated that some areas would be reclaimed simultaneously as other areas are being mined. When considering the differences in site potential and other environmental factors, vegetation reestablishment would occur on an increasing portion of acres reclaimed but at an unknown rate.

**LIVESTOCK GRAZING:** The North Shoshone Allotment is stocked for cattle grazing at 40 acres/AUM and the Black Draw Allotment is stocked at 20 acres/AUM. The present kind and number of livestock and the number of days/seasons they graze are expected to continue. The effects of grazing can change from year to year depending upon how heavily the vegetation is grazed in relation to that year's vegetative forage produced. Annual forage produced varies depending on precipitation and effects from previous years of grazing. Reclaimed areas can be impacted by livestock grazing if livestock are not fenced out of such areas.

***Reasonably Foreseeable Future Actions:***

**BENTONITE MINING:** Bentonite has become an important locatable mineral, being used for kitty litter, drilling mud to lubricate oilfield drilling equipment, as a binding agent for taconite iron pellets, as well as for crayons, medicines, food thickeners, and cosmetics. Sodium-bentonite deposits in Wyoming make up about 70% of the world's known supply, suggesting that bentonite mining will continue well into the future in Wyoming and the Bighorn Basin. It is currently economical to remove up to 50 to 80 feet of overburden to extract the bentonite. The BLM estimates bentonite mining will continue with another 9,000 to 10,000 acres of bentonite mining-related disturbances in the Cody Field Office area in the reasonably foreseeable future. There are over 2,000 acres of mining that have been approved but not yet mined, as well as 4,500 acres of proposed mining that have not yet been approved.

**LIVESTOCK GRAZING:** Livestock grazing on public lands has been occurring for over 100 years in the Bighorn Basin and is expected to continue at similar levels into the future.

***Incremental effect of each Alternative***

**Alternative I**

Alternative I would not add to the incremental effects that already exist in the area because the proposed bentonite mining would not take place.

## Alternative II

### **White Rock Modification CEA Area - Incremental Impact of the Proposed Action**

Within the CEA area, the primary activities are bentonite mining and livestock grazing. One-half of the CEA area is utilized for livestock grazing, and approximately 120 acres have been disturbed by bentonite mining (~0.5% of the total area); another 387 acres are planned for new mining (1.8% of the total area) over the next 10 years. The Proposed Action would incrementally add 291.5 acres of mining disturbance within the analysis area (21,248 acres), or 1.4% of the total CEA area. Several maps (Figures 6, 7, and 8) were generated to overlay existing and known projected land uses; known wildlife, Threatened and Endangered, and BLM Sensitive species habitats and nesting sites; and general vegetation communities in the area near Lovell, Wyoming.

According to the 2014 Annual Reports submitted by the four bentonite mine companies operating in the Cody Field Office, approximately 18,000 acres of land have been disturbed by bentonite mining. Approximately 20% of the amount of land mined for bentonite in the field office has been successfully reclaimed to the extent that it was released from bond. Approximately 54% of land disturbed by bentonite mining is reclaimed but not released from bond because it doesn't yet meet reclamation bond release standards, leaving the remaining 20% of land in active mining status. In addition to the already disturbed areas, there are over 2,000 acres of mining that has been approved but not yet mined, as well as 4,500 acres of proposed mining that has not yet been approved. The bentonite companies continue to post larger reclamation bonds each year in order to continue to mine, as is required by the regulations. The BLM and the WDEQ-LQD will not release bonds until the reclamation meets specific standards.

### **Livestock Grazing**

Past, present, and future bentonite mining incrementally reduces the amount of livestock forage, and can affect ranching families and their lifestyles. Bentonite mining has and will continue to encroach on portions of these operations, in some cases increasing problems with use of existing range improvements, costing extra time and money to maintain range improvements, and causing permittees to gather up livestock that escaped for reasons associated with mining activities (i.e., gates left open, fences down, cattle guards filled with dirt from haul trucks, cattle traveling long distances on haul roads and into unauthorized areas, etc.). Presently in the CEA area, there are approximately 120 acres disturbed by mining, which equates to some financial and operational losses to the grazing permittees. With the addition of 387 acres of planned bentonite mining, which includes 291.5 acres from the Proposed Action, approximately 2.4% of the CEA area would be disturbed by bentonite mining over the next 10 years. Up to 291.5 acres of public lands and the forage it produces for livestock grazing annually would be directly affected by the proposed White Rock Modification.

AUMs available for livestock grazing would most likely continue to be temporarily reduced, as bentonite mining continues to remove available forage until reclamation is successful. Depending on the number of acres of mining approved in the area and the number of those acres that are mined at one time by various mining companies, local grazing allotments potentially could lose hundreds of AUMs prior to successful reclamation. If the amount of disturbed acreage continues to increase as expected, coupled with the amount of time needed for vegetation to reestablish after land reclamation, cumulative impacts not only will increase on the mined or disturbed areas, but also on the remaining undisturbed lands as demand increases for forage from those undisturbed lands.

### **Wildlife**

Wildlife habitat is lost and made less suitable through fragmentation and degradation until reclamation is successful. Prior to mining, wildlife populations were more robust and resilient, enjoyed more available habitat, and were able to compensate better when faced with habitat loss.

With increased habitat loss from mining, wildlife populations have a harder time rebounding from disturbance driven population declines. Species most affected by these incremental actions (mining, livestock grazing, and development) have been listed as BLM Sensitive Species and now require conservation actions to stop further decline or possible placement on the Threatened and Endangered Species List. The incremental effect of the Proposed Action, in addition to past and present disturbances, may further fragment and reduce population size and connectivity, possibly adding to the justification to warrant species listing under the Threatened and Endangered Species Act. Through these mining impacts, and other past, present, and future factors on the landscape, allotments may fall below the threshold for Standard #4 of Healthy Rangelands in Wyoming for wildlife habitat quality.

### **Soil, Water, Riparian-Wetland Areas, and Aquatic Habitats**

The mining and attendant road system disturbance and other environmental effects from mining, livestock grazing, and other area developments modify hydrology, sediment regimes, and water chemistry which can cause impacts to water, riparian-wetland areas, aquatic habitats and the species that use them. Soil modifications would affect its important biological and physical viability. As the surface disturbance associated with mining and livestock grazing increases, soil and water-related impacts incrementally accrue inside and outside of the CEA boundary.

### **Cumulative Effects Analysis Summary**

Under the Proposed Action, the projected maximum incremental amount of new disturbance per year by ACC over the ten-year life of the mine could be around 30 acres. The Proposed Action would incrementally add up to 291.5 acres of mining disturbance within the CEA area, or 1.4% of the total CEA area (21,248 acres). There are approximately 387 acres of planned mining in the CEA area which would be mined over the next decade, including the remaining unmined 95.6 acres approved in the Joy-Pak Plan of Operations and the 291.5 acres proposed in the White Rock Modification.

Under the Proposed Action, mining and reclamation occur concurrently as part of the castback method. Based on the known affected environment and environmental consequences of the Proposed Action, the CEA indicates that the incremental effects of the Proposed Action, coupled with other existing and planned land uses on wildlife habitats/species, vegetation, and soils could be mitigated or reduced over time, depending on recovery time, adequate precipitation, and reclamation success, using the stipulations, BMPs, and mitigation and monitoring measures outlined in the proposed mine and reclamation plans, if approved by the WDEQ-LQD and the BLM, and properly implemented by ACC.

## **4.5 Residual Impacts**

### **Alternative I: No Action**

There would be no residual impacts under Alternative 1, as the proposed mining would not be approved; there would be no new disturbance or impact on the land.

### **Alternative II: Proposed Action**

The following are potential residual impacts that could occur as a result of the Proposed Action:

- 1) Though recontouring and reseeding of the land would follow the proposed mining process, the landscape would not appear as it did prior to mining. Ridges would be lost or changed, reclaimed road beds may be present, drainages would be altered, and soils and vegetation would be modified.

2) Reseeding would be done during the reclamation process of the Proposed Action, but seeded species may not all reestablish. There would be residual effects on vegetation, as similar species to those that existed pre-mining may not return over the short or long term. Changes in soil characteristics would change the type of vegetation that could grow in the area. The proposed mine area could take decades after initiation of reclamation to achieve vegetative production and species diversity comparable to pre-mine conditions. The area would not function the same ecologically. It may take years to get bond release based on current methods, and pre-mine vegetative diversity and productivity may not be restored for years after initial disturbance. The disturbed area could be accommodating to weed species; some weed species cannot be eradicated from an area once they establish and would be present in the reseeded areas for the foreseeable future. Changes in vegetation would also affect surface water, soil stability and health, wildlife habitat quality, and grazing.

3) The Proposed Action would involve the removal and replacement of topsoil on mined areas. This handling of topsoil would cause residual effects, as the biota within the soil and the soil's structure and chemistry would be modified during the process. Some soil would be lost to erosion during the proposed mining process. After successful reclamation, soils would be able to function as they did before the area was mined and support a diverse vegetative community. Changes in topsoil quality would have a residual effect on vegetation, surface water and related resources, wildlife habitat and grazing.

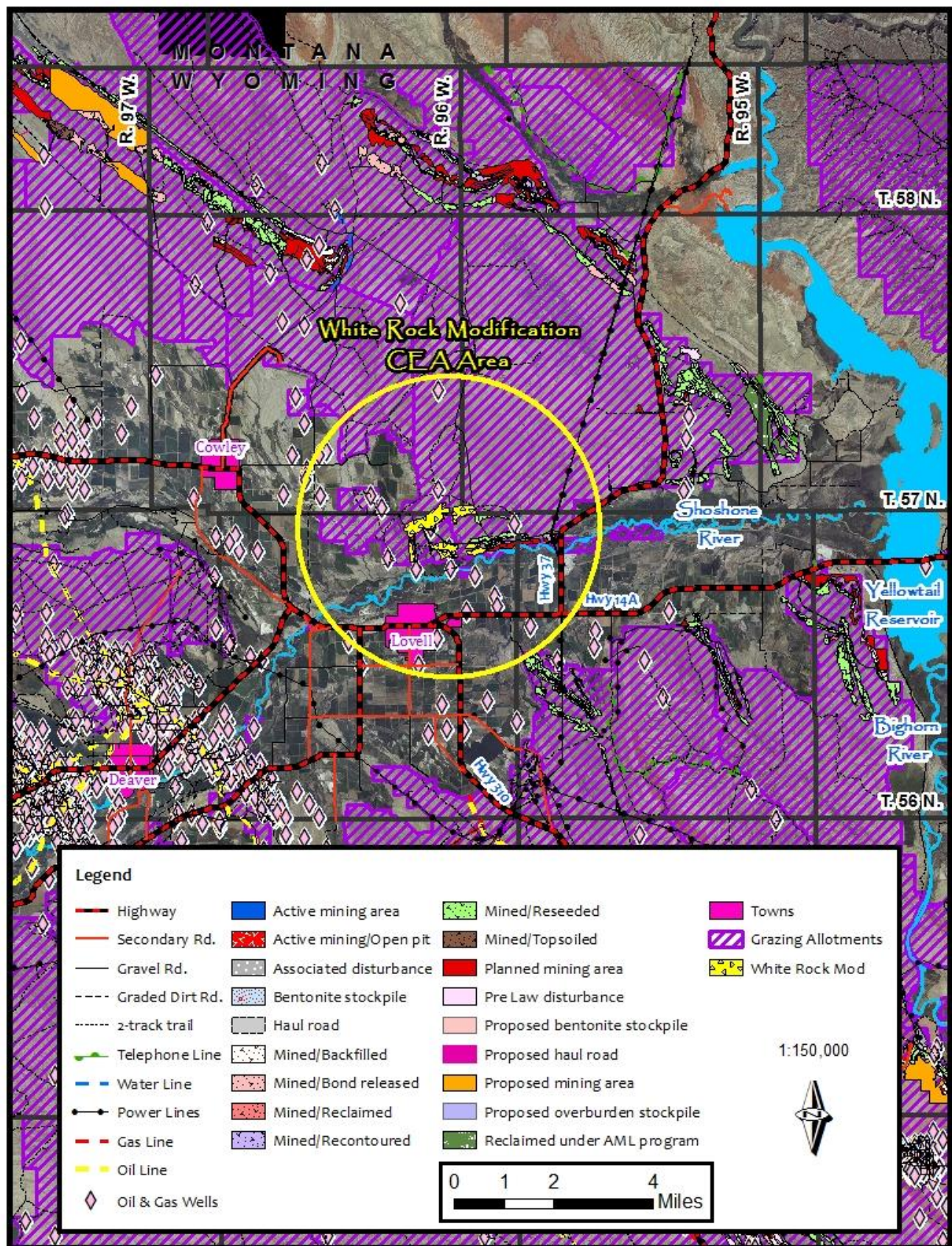
4) The Proposed Action would cause residual effects to wildlife populations, including those of migratory birds and BLM Sensitive Species, for decades. Even though the area is reseeded, if vegetation does not reestablish well or result in species similar to pre-disturbance conditions, wildlife would not be able to use the area as they did prior to mining. Also, habitat fragmentation would continue to occur throughout this, and surrounding, mine areas. Many wildlife species even avoid undisturbed habitat near active mining areas.

5) The Proposed Action may have residual effects on livestock grazing if the vegetation does not reestablish after reclamation. Invasive weed species would also be given a chance to establish in the area, replacing native vegetation. If this happens, the amount of livestock forage in the allotments included in the proposed mining would likely be reduced for years until desirable vegetation reestablishes.

6) The Proposed Action would not result in any unavoidable residual impacts to cultural resources unless such resources were located during mining or road construction and *not* reported to the BLM Authorized Officer. Improvement of haul roads could facilitate access to the project area, thereby increasing the potential for additional unauthorized surface collection and looting. However, the Cultural Resource Stipulations listed in Section 4.3.2 would mitigate cultural resource residual impacts.

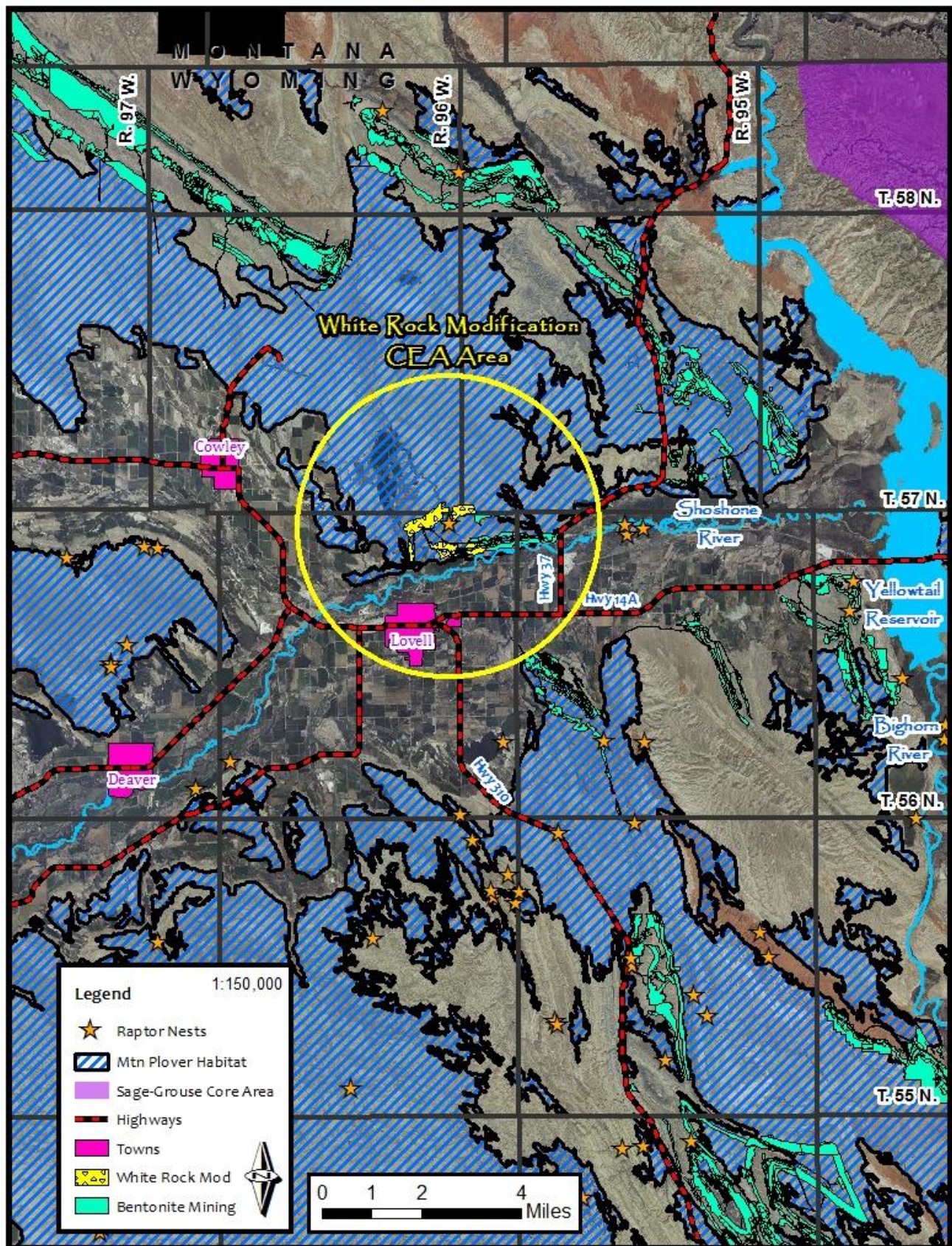
7) Removal of bentonite under the Proposed Action would constitute an unavoidable, long-term, irreversible, residual impact on the bentonite resource.





**Figure 6. Land uses (existing and proposed) surrounding the White Rock Plan Modification Area.**  
*No warranty is made by the BLM for use of this data for purposes not intended by the BLM*

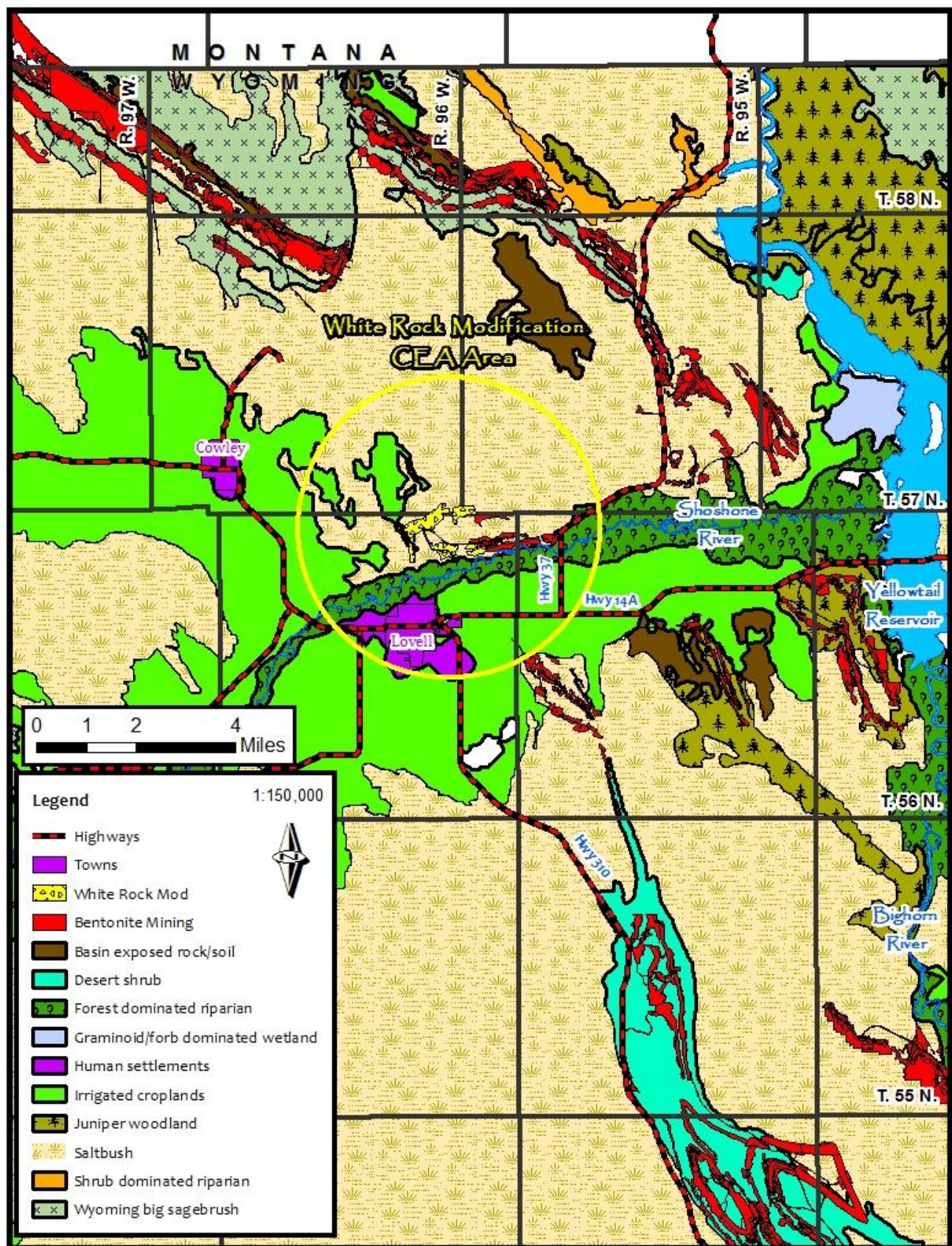






**Figure 7. Raptor nests, Mountain Plover Habitat, and Sage-grouse Core Area surrounding the White Rock Modification Area**

*No warranty is made by the BLM for use of this data for purposes not intended by the BLM*



**Figure 8. Vegetation types surrounding the White Rock Plan Modification Area**  
*No warranty is made by the BLM for use of this data for purposes not intended by the BLM*

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Gretchen Hurley	Geology, Paleontology, Mineral Resources, Air Quality
Brad Johnson	NEPA
Bryan McKenzie	Range, Vegetation, and Invasive, Non-native Plant Species
Paul Rau	Recreation and VRM

## 7.0 Consultation

Craig Smith	WDEQ-LQD
Mark Sattelberg	U.S. Fish and Wildlife Service
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## 8.0 References

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## Appendix A – Climate

Climate of the area is typical of cold desert regions of the inter-mountain west. The White Rock Modification area falls under normal conditions, in a 5 to 9 inch precipitation zone. However, the entire Bighorn Basin has been experiencing a severe drought since 1999 with precipitation rates generally much lower than average (NCDC, 2011). Outside of drought conditions, climate in this area was typical of cold desert regions of the inter-mountain west, with long, cold winters; hot, dry summers and moderate to high winds.

Average maximum temperatures for the White Rock Modification area are during the months of June, July and August as expected, and average minimum temperatures are during the months of December, January and February. Between 1897 and 2010, the mean average annual high temperature in the area was 59.0°F, and the mean average annual low temperature is 30.1°F (See Table 3 below). Average total precipitation for the area is 6.66 inches/year with most of this precipitation falling during the months of May and June. This area has average annual precipitation of 5 to 9 inches, approximately 80% of which falls between April and October. The remainder falls during the months of December through February in the form of snow and/or rain. The growing season for cool season species is approximately April 15 to June 30.

The following table provides a summary of climatic data for Lovell, Wyoming from 1897 to 2010 as recorded by the Lovell, Wyoming HPRCC station (2011):

**Table 3. Lovell, Wyoming (485770) Period of Record Monthly Climate Summary**

Period of Record: 4/ 1/1897 to 9/30/2010

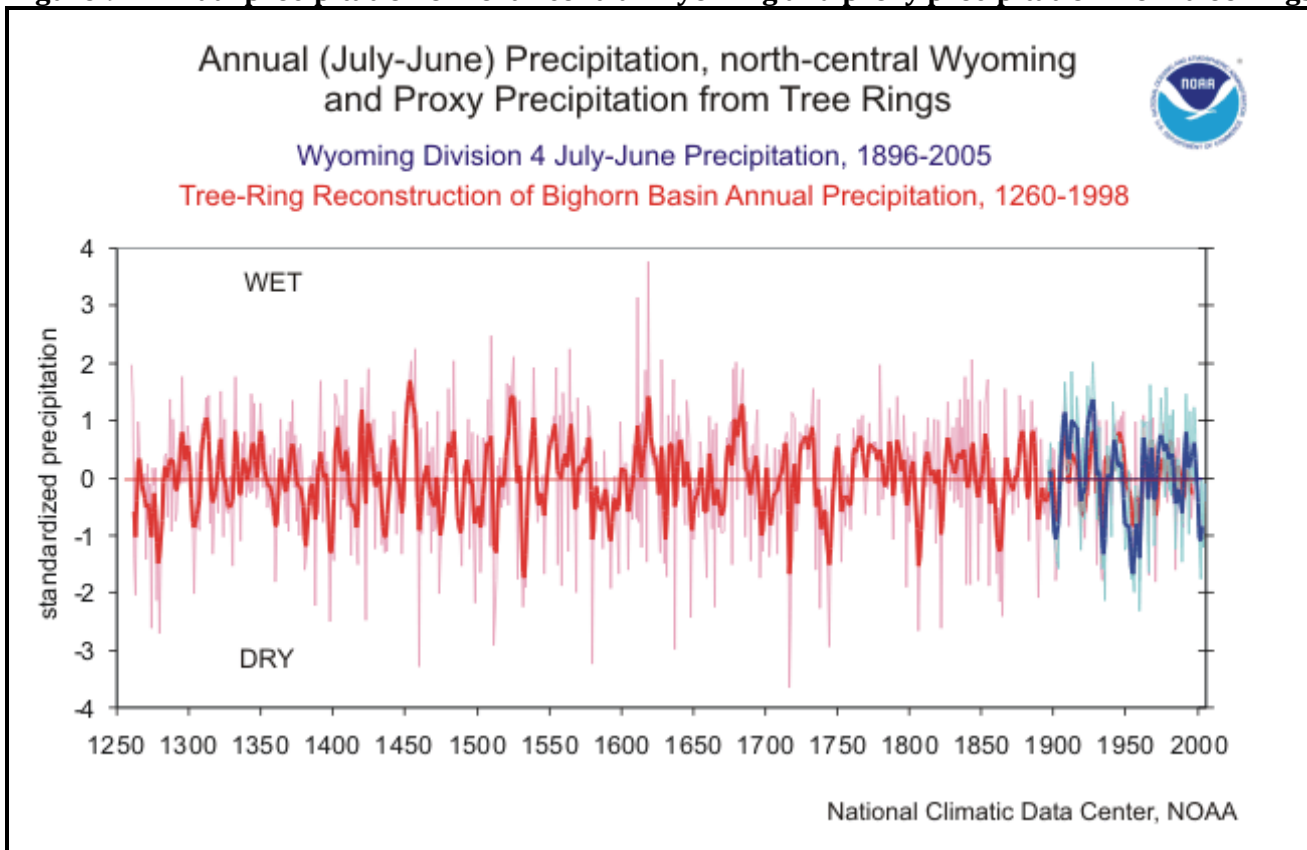
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	29.5	36.8	47.5	59.3	69.2	78.9	88.3	85.9	73.9	61.1	44.8	33.1	59.0
Average Min. Temperature (F)	4.5	10.9	20.6	30.8	41.0	49.0	54.3	51.1	40.8	30.5	18.9	8.4	30.1
Average Total Precipitation (in.)	0.30	0.20	0.33	0.63	1.15	1.13	0.63	0.49	0.72	0.57	0.28	0.24	6.66
Average Total Snow Fall (in.)	4.2	2.5	2.5	1.3	0.2	0.0	0.0	0.0	0.4	0.7	1.7	3.9	17.5
Average Snow Depth (in.)	2	1	0	0	0	0	0	0	0	0	0	1	0

A National Climatic Data Center (NCDC) is located in Lovell, Wyoming. Figure 9 below shows the average annual (July-June) precipitation, 1896-2005, for Wyoming Division 4 (5-year annual values in light blue, 5-year weighted average in dark blue). “Several severe multi-year drought events can be seen in this record: around 1900; the mid-1930s Dust Bowl; the 1950s; and the last six years (1999-2005), all of which have been below the long-term average.” Also shown on Figure 9 below is a 739-year tree-ring reconstruction (1260-1998) of Bighorn Basin annual precipitation (annual values in light red; 5-year smoothed values in dark red). As per

NCDC: "...this reconstruction is based on four long tree-ring chronologies (one Douglas-fir, three limber pine) from the Bighorn Basin, and was calibrated on an instrumental precipitation record (1907-1996) averaged from five long-term weather stations in the Bighorn Basin, four of which are within Wyoming Division 4: Buffalo Bill Dam, WY; Lovell, WY; Powell Field Station, WY; Worland, WY; and Bridger, MT. The reconstruction was calibrated on a 13-month "annual" period (June-June), but it correlates well with the Wyoming Division 4 annual (July-June) precipitation."

"Over their common period (1896-1996) the correlation is 0.602, indicating a high degree of shared variance. The precipitation units shown are standardized for comparison; negative values indicate below-average precipitation, and positive values indicate above-average precipitation."

**Figure 9. Annual precipitation of north-central Wyoming and proxy precipitation from tree rings**





## **Appendix B – BLM seed policy in IM-2006-073**

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240  
January 20, 2006

EMS TRANSMISSION 01/27/2006  
Instruction Memorandum No. 2006-073  
Expires: 09/30/2007

To: All Field Officials

From: Director

Subject: Weed-Free Seed Use on Lands Administered by the Bureau of Land Management

Program Area: All programs which place seed, or approve the placement of seed on public lands.

Purpose: This Instruction Memorandum (IM) describes Bureau of Land Management (BLM) policy for the quality of seed purchased by BLM for use on public lands.

Background: The BLM Manual Section 1745 (1992) establishes policy and guidance for transplantation, augmentation, and reestablishment of habitat on public land utilizing native, and when necessary, introduced plant species. This action will comply with all Federal and State regulations, restrictions, and requirements governing the release and distribution of non-native exotic plants, including weed seeds.

BLM's Partners Against Weeds – An Action Plan for the Bureau of Land Management, January 1996, outlines BLM's plan to prevent and control the spread of noxious and invasive weeds on BLM lands. In addition, the 1999 Executive Order No. 13112 on Invasive Species states that each Federal agency shall not authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species in the United States.

The BLM obtains/purchases native or introduced plant seed, from seed producers and collectors for stabilization, rehabilitation, or restoration of public land. Prior to BLM accepting seed from any source, all seed must be tested for noxious weed seed at official state seed analysis labs. Noxious weed seed is not allowed in certified seed according to individual State's Department of Agriculture seed law and the Federal Seed Act. It has been acceptable for the seed lot (excluding species on the State and Federal noxious weed seed list) to contain from 0.5 percent to 2.0 percent of other "weed" seed depending on the State. "Other weed seed" is defined as any non-noxious weed seed, such as cheatgrass (downy brome) or Russian thistle, in the State(s) of concern. When purchased, all seed must also be of certified quality or source-identified.

Policy/Action: All Field Offices are required to use seed on public lands that contain no noxious weed seed and meets certified seed quality. All seed to be applied on public land must have a valid seed test, within one year of the acceptance date, from a seed analysis lab by a registered seed analyst (Association of Official Seed Analysts). The seed lab results shall show no more than 0.5 percent by weight of other weed seeds; and the seed lot shall contain no noxious, prohibited, or restricted weed seeds according to State seed laws in the respective State(s). The seed procured for use on public land will meet the Federal Seed Act criteria. Seed may contain up to 2.0 percent of "other crop seed" by weight which includes the seed of other agronomic crops and native plants; however, a lower percent of other crop seed is recommended. Copies of the seed lab test results, including purity and germination (viability) rate, must be forwarded to the appropriate BLM office prior to seed application. If the seed does not meet the BLM and State/Federal standard for noxious weed seed content or other crop seed allowances, it shall not be applied to public land. All seed test results must be retained in the seeding project file.

The BLM State contracts for seed may be more restrictive with “other weed seeds” of concern as deemed necessary.

All donated seed or seed used for “mitigation or restoration” by contractors per a reclamation plan must meet BLM’s noxious weed seed policy prior to use on public lands.

An exemption will be allowed for small reclamation projects, less than 20 acres or not to exceed 200 pounds of seed, which have an approved BLM reclamation or rehabilitation plan or permit. The seed will be accepted if accompanied by an official seed analysis report that provides documentation to show no noxious weed seed per State(s) weed law and no more than 0.5% other weed seeds. For this exception, any one of three seed test documents will be accepted:

1. A certified “blue” tag or tags.
2. An independent seed lab test.
3. A seed lab analysis supplied by a vendor either by seed lot or by seed mix.

Straw or mulches applied as part of seeding, stabilization, rehabilitation, or restoration projects on public lands must be certified to be weed seed-free.

Timeframe: Effective immediately.

Budget Impact: Approximately 80% of the seed used on public lands is purchased during a National Seed Buy (three times a year average) via a national seed contract. Under this contract, the seed must be tested prior to acceptance and payment. Therefore, there will be no new costs associated with the National Seed Buy. For offices and programs not currently testing their seed for noxious weeds or are approving project proponents to apply seed on public land without first testing for noxious weeds there will be a slight increase in the cost of seeding treatments. A typical seed test costs between \$120-220 per lot for purity, germination, and noxious weed seed analysis.

Manual/Handbook Sections Affected: None.

Coordination: Coordination for this IM has been with WO-200, WO-220, WO-230, WO-270, WO-310, ID-930, BC-660.

Contact: If you have any questions on policy, please contact Jack Hamby, National ES&R Program Lead, at (202) 452-7747 or via email at [Jack\\_Hamby@blm.gov](mailto:Jack_Hamby@blm.gov). Questions pertaining to seed test, viability, seed lot tags, or weed seeds should be directed to Scott M. Lambert, National Seed Coordinator, Idaho State Office, at (208) 373-3894 or by e-mail [Scott\\_Lambert@blm.gov](mailto:Scott_Lambert@blm.gov).

Signed by:  
Lawrence E. Benna  
Acting, Director

Authenticated by:  
Robert M. Williams  
Policy and Records Group, WO-560